

Railway Age

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The Outlook for Railway Prosperity

THE railways have entered the year 1925 with better prospects of earning something approaching a satisfactory net return than they have had at the beginning of any year since 1917. This should be gratifying to every class of persons affected by the railway situation—and what class is not affected by it? The prospects of the railways of some territories are better than those of railways in other territories. We refer to the prospects of the railways as a whole.

It is paradoxical, but nevertheless a fact, that for many years the earning by the railways of a large net return has been regarded by some classes of persons in an entirely different way from that in which they have regarded the earning of large profits in other industries. All except those of socialistic tendency, who desire the destruction of the present industrial system, want to see prosperity prevail. The prevalence of prosperity necessarily involves the earning of substantial profits in agriculture, manufactures, mining, banking and commerce. Therefore most people always have wanted to see large profits made in most lines of business. But many people have thought that if the railways earned substantial profits they must derive them from excessive rates, and that these rates must be a burden on the industry and commerce of the country and therefore ought to be reduced.

Gradually, however, a change in public sentiment regarding railway profits has been occurring. Most business men and many farmers and railway employees now realize that their own prosperity in the long run largely depends upon the prosperity of our railway system.

Railway officers of all classes, of course, feel gratification when the net operating income of their various roads increases, because this is the fruition of all their efforts to increase traffic, get reasonable rates for handling it, render good service and operate efficiently and economically. All the innumerable producers of raw and manufactured products who directly or indirectly sell materials and equipment to the railways, and who understand their own interest, feel gratified when there is an actual or prospective increase in railway net operating income, because an increase in net operating income always is accompanied by increased railway purchases. The materials and supplies bought by the railways, the expenditures for which amount to many hundreds of millions of dollars annually, are used in maintenance, in permanent improvements and on new equipment. When the net operating income being earned increases more liberal expenditures for maintenance are made. This results both in larger purchases and in more men being employed.

But these are not the most important effects of an in-

crease of net operating income. There is one plain, simple and very important fact about the railroad business which is usually overlooked by many persons. This is that virtually every improvement in or addition to the property of the railways which enables them to render improved or increased service is and must be made directly or indirectly from net operating income. Even at present, after all the reductions of operating expenses that have been made during the last four years, about four-fifths of all the earnings the roads make are immediately, day by day, paid out by them to meet operating expenses and taxes. Now, the outlays in operating expenses and taxes make it possible to render the service that is rendered today, but they do not provide means for rendering better and additional service tomorrow, next week and next year.

These means are and must be provided by capital expenditures. If all the capital expenditures of the railways should suddenly stop it would be only a short time until many roads would be unable to increase by a single ton the amount of freight they could handle. The capital with which to make capital expenditures is obtained in two ways. Most roads after paying interest and dividends have some net operating income left which they invest in improvements and new equipment. But the bulk of all the new capital invested is and must be raised by the sale of funded securities and stock, and they can be sold only if the current or prospective net operating income is sufficient to pay satisfactory interest and dividends.

It necessarily follows that the amount of capital investment that can be made is in the long run wholly dependent upon the amount of net operating income earned. Now, with the prospect of an increase in the net operating income earned there is also the prospect of an increase in capital expenditures. To working men this means an increase in the demand of the railways for labor. To manufacturers it means an increase in purchases of materials and equipment. To the public it means an increase in the capacity of the railways to enable them to handle the country's growing commerce, and also an increase in the efficiency and economy of operation which will tend to make it possible in the long run to handle traffic at lower rates. These are unanswerable reasons why every class in the country should rejoice because the railways have entered the year 1925 with the prospect of a substantial increase in the net operating income earned by them.

The reasons why there is prospect of an increase in net operating income may easily be stated. The total freight business handled in the last one-third of 1924 apparently was larger than in any previous corresponding period. The roads had succeeded in effecting such large economies

in operation that the increase in traffic resulted in a substantial increase of net operating income. There are many convincing reasons for believing that in 1925 freight business will be at least relatively as large as it was in the closing months of 1924. Undoubtedly there will be an increase of operating expenses. Some advances in wages recently have been granted, the full effect of which will be shown in 1925. It seems probable there will be some advance in the cost of coal. Both these causes will tend to increase the cost of conducting transportation, which necessarily fluctuates with changes in the volume of business. It is easily conceivable that there will be further increases in the cost of labor. Prices of materials and supplies recently have been increasing somewhat. Maintenance expenses probably will rise. But most railways, in spite of the recent large increase of traffic, have continued to show a good deal of surplus capacity. If traffic should so increase as to enable them to utilize their full capacity it seems probable the increase in total earnings would substantially exceed that in operating expenses. While there is the prospect of an increase of net operating income, it cannot be said this is so good as to justify the expectation or hope that the percentage of return earned on the investment in railway property will be as large as it has been in past years of unusual prosperity.

The average return earned by all the railways on their property investment in 1909 was 5.22 per cent; in 1910, 5.53 per cent; in 1916, 5.93 per cent. In 1923, when net operating income amounted to \$975,000,000, it yielded a return of only 4.56 per cent on property investment. It is probable when complete statistics for 1924 are available it will be found that the next operating income earned last year was approximately the same as in 1923. But the investment in property had increased and it is probable the percentage of return earned was not more than 4.4 per cent. The net operating income of the railways would have to be over \$300,000,000 more, or 40 per cent greater, in 1925 than it was in 1924 to make them relatively as prosperous in 1925 as they were in 1910. It would have to be about \$400,000,000 more, or 40 per cent greater, in 1925 than it was in 1924 to make them relatively as prosperous as they were in 1916.

Nobody is optimistic or imaginative enough to believe they will have restored to them the prosperity they enjoyed in these exceptional years. What can be reasonably hoped and expected is that they will make a long advance toward the condition of relative prosperity which they enjoyed previously to ten years ago when the cumulative effects of restrictive regulation deprived them of opportunity to earn fair returns.

Keeping the Public Pleased and Informed

IT is not too late yet to make good New Year's resolutions. If there is any railway officer who has not made a resolution to do all he reasonably can in 1925 to make and keep the public friendly to the railways he ought to make it now.

The *Railway Age* has been talking so long and so much about the necessity of creating a better sentiment toward the railways that we suspect some of our readers are growing tired of our lubrications and fulminations upon this subject. Doubtless some of them believe, in view of recent developments, that the public and employees have been educated enough about railway matters and that railway officers should, for awhile at least, devote themselves to their primary functions of soliciting business, making timetables, effecting economies and running trains.

If there are those who think thus we can cite some high authorities who do not agree with them. For example, C. H. Markham, president of the Illinois Central, says in an article which we publish elsewhere in this issue: "Railway success today and for the future must be based upon a judicious combination of deeds and words." He adds: "An important part of every railroad's work should be the cultivation of public confidence by the recital of achievements made and the promise of progress in the future," and he concludes by saying: "That work, I believe, will come to take rank with the work of running trains." Other railway executives in the articles we publish elsewhere express similar views.

Public sentiment toward the railways at the present time probably is more friendly than for years. This is not due

to fortuitous circumstances. It is due to hard work that has been done to win public favor. But public sentiment is a fickle jade. She has no use for those who neglect her. She bestows her smiles on those who court her. There are those who make a business of courting her. The railways long neglected her, and these other persons made great progress in her favor by encouraging her tendency to feel resentful toward the neglectful railways. Public sentiment has more power to determine what profits the railways will earn than all the officers of all the railways combined. If the railways should neglect public sentiment again it would be only a short time until they would be fighting for their financial lives again.

It cannot be repeated too often that there are broadly speaking two ways to win public favor. One is to treat railway patrons well. The other is constantly to give to the public the facts about the railroad business that it wants to know and ought to know.

A most constructive step toward getting a good and intelligent understanding with the shipping public was made when the Regional Shipper's Advisory Boards were organized. As a means of communication and co-operation between the shippers and the railways they approach the ideal. The improvement in railway service within recent years has had a most beneficial effect upon the sentiment of the shipping public. But there are more people who come directly in contact with the railways as travelers than as shippers. There has been a marked improvement on most roads in the way the traveling public is treated since the roads were returned to private operation. As

one travels about over the country, however, he realizes that there is still much room for improvement.

Is there not something that can be done to reduce the number of persons who have to stand in line on long passenger trains awaiting an opportunity to get into dining cars? The necessity of doing so certainly causes a lot of people to "cuss" railway service. Of course, the reason for it is that all passengers want to eat at about the same time. But if the evil cannot be abolished, cannot something be done to mitigate it? We have repeatedly called attention to the fact that European railways avoid it by asking people what time they want to eat and giving them tickets entitling them to a sitting at a specified time and a specified table. The table-d'hôte meal system helps to make this practicable. On not a few trains in this country, however, table-d'hôte meals are being served, and still passengers stand in line for them. The operating and passenger officers of American railways ought to be resourceful enough to at least reduce this source of irritation. Again, is it worth while, in order to reduce switching, to put the dining car on a train of twelve or fifteen cars at the end of the train and make it necessary for those in the forward cars to walk long distances to the dining car? When the average man has walked through a dozen sleeping cars and has found he must wait a long time before he can get into the dining car he is quite likely to become irascible.

The existence of such conditions as those mentioned make it especially necessary that dining car stewards should be men of the most exemplary patience and courtesy. Many of them are. Many of them are not. Few things can do as much to popularize a railway as dining car service which includes not only good food, but the most considerate and courteous attention from the dining car employees.

The problem of the late passenger train still exists. The frequency with which passenger trains are late is due to many causes. "On time" operation is, however, a subject to which too much study cannot be given as a means of improving public sentiment.

Railway officers are very human, just like other people. It is human when a particular situation gets so bad that it commands attention to give it the needed attention until it is improved and then to grow more or less lax until it gets bad again. This is illustrated by the accident situation. About fifteen years ago the number of people injured and killed in accidents resulting from the operation of trains became so large that it was a public scandal. The great "safety first" movement was started and carried on so energetically and successfully that in 1921 fewer people were killed on our railways than in any year since 1898 in spite of the vast increase in traffic that had occurred meantime. Recently we have not heard so much about "safety first" and the number of fatalities has shown a tendency to increase. The tendency is not alarming, but it needs watching. In 1923 the number of passengers and employees killed was 401 more than in 1921. In the first eight months of 1924 the number of passengers and employees killed was 310 less than in the corresponding months of 1923. Fifteen years ago the accident record was one of the principal causes of the unpopularity of the railways. Of course the desire to save human lives and limbs should be the most powerful of all incentives to efforts to reduce accidents, but the favorable effect of safety of operation upon the sentiment of employees and the public is a consideration which should not be overlooked.

As Mr. Markham says, however, in the article already referred to: "It is not enough for a railroad to attend to its own business and please its customers today by providing service that is both efficient and cheap; it must make secure its future by recording that performance in the minds of the public so that no one will question its right to a fair return that will attract investment." Only too much experience has shown that the rendering of good and efficient service is not enough to win and keep public favor. As it has not been enough in the past, so it will not be enough in 1925 or in the more remote future. The public must be kept pleased; it must be kept informed; and then the future of the railways will be secure.

Business Prospects and Capital Expenditures

THE conditions existing in the railroad business in the closing months of 1924 were quite different in several important respects from those existing late in 1923. These differences seem to make it practicable to forecast with some confidence certain respects in which the conditions in at least the first one-half of 1925 will differ from those which existed in the first one-half of 1924.

In the first one-half of 1923 freight business was larger than in the first one-half of any previous year, but it did not maintain its increase and in the latter one-half of the year was less than in 1920.

The reverse was true in 1924. The slowing down in the latter part of 1923 was followed by a decline of traffic which made it less during the first two-thirds of 1924 than

in the corresponding parts of 1920 or 1923. In the last one-third of 1924, on the other hand, there was an increase of traffic which carried it above all previous records. What does this indicate for 1925?

We publish elsewhere articles by a number of railway executives in which, among other things, they give their views regarding the probable freight business of 1925. Railway executives have learned from experience to be cautious about making predictions concerning future business.

Many conditions determine the volume of freight business. One of these is the crop situation. The finest promise of increased traffic may be blighted by a serious crop failure. While, however, the railway executives are cautious in making their forecasts, they are virtually

unanimous in anticipating an increase of business in 1925.

That they are expecting a substantial increase of business is also indicated by the information given in an article appearing in this issue entitled "Railway Expenditures will Establish New Records in 1925." This refers to expenditures for new equipment and improvements.

This is the third issue of our Annual Statistical Number in which we have published an article such as this regarding the probable capital expenditures of the railways during the subsequent year. In each case information regarding their budgets has been furnished to us by only a part of the railways, but in each case the information furnished by them has proved a good forecast of what all the roads were going to do. Past experience indicates that the information given in the article in this issue is the forerunner of total capital expenditures in 1925 about 15 per cent larger than those made in 1923 and in 1924. Both actual experience in 1924 and the estimates for 1925 indicate a relatively larger increase in expenditures for improvements in fixed properties than in the expenditures for equipment. At the same time, on the basis of the advance information that has been furnished, the *Railway Age* ventures to predict that the total orders for equipment in 1925 will be at least as large as they averaged in 1923 and 1924. The orders placed for equipment in a year are largely determined by the volume of business actually being handled, and freight business in 1925 now promises largely to surpass all past records.

The reasons why the managements of the railways are showing a tendency to increase expenditures for permanent improvements more than for equipment are plain enough. One of them is a financial reason. For some years it has been easier to raise capital with which to buy equipment than for other purposes because equipment trust notes can be issued for the purchase of equipment, while practically all permanent improvements must be financed by the issuance of bonds and stocks. The improvement in the financial situation of most railways which recently has been occurring is increasing the number which can sell bonds and even stock. It is probable that the improvement in, and increase in the capacity of, the equipment of most roads have within recent years proceeded more rapidly than the improvement and expansion of other facilities. This being the case the tendency to increase investment in other facilities more in proportion than in equipment is a natural one.

It is an interesting and important question whether in spite of the large capital expenditures that are being made and planned for, there is not at present a tendency among railway officers to somewhat underestimate the future increase of freight business. There is a considerable resemblance between the developments which occurred between the years 1913 and 1916 and those which have occurred between the years 1920 and 1925.

In the year ended on June 30, 1913, the railways handled a record freight business. During the year ended June 30, 1914, there was a decline of business and during the next year there was a further decline. In midsummer 1915, however, there began a large increase in freight business. The increase in freight earnings between July and October was about 30 per cent. This increase continued throughout 1916.

It might have been assumed in 1914 and 1915, when general business was very poor that no large increase in

the productive capacity of the country's industries was occurring. In the calendar year 1916, however, the number of tons carried one mile was 65 billion more than in the year ended on June 30, 1913. For the three and one-half years intervening there was an increase at the rate of $18\frac{1}{2}$ billion ton-miles annually. The freight business of the calendar year 1916 was almost 22 per cent greater than that of the year ended June 30, 1913.

Not since 1920 has there been in any year any such increase over the business of any previous peak year as was merely normal before the war. The number of tons carried one mile in 1923 was only about three billion more than in 1920. In other words, since 1920 there have elapsed four years during which there has not been a normal increase of business. Meantime the country's population and productive capacity have been increasing. In view of the general financial and business conditions now existing it would appear that the time has about come for the railways to have one of their huge pre-war increases of business. Perhaps it will not come this year. Predictions regarding such developments are extra-hazardous. That sooner or later it will come, however, there can be no serious question. When the lady asked of the sea captain: "Do you think it will stop raining, Captain?" he answered, out of long experience: "I think it will, Madam; it always has."

Between 1913 and 1916, when business was poor, the railways invested relatively little capital in new facilities, and even in 1916 the capital expenditures made by them were small. The total increase in the investment in road and equipment between June 30, 1913, and December 31, 1916, was \$1,254,000,000, or at the rate of \$360,000,000 a year. The increase in the total tractive power of locomotives was $8\frac{1}{2}$ per cent and in the total capacity of freight cars 6.1 per cent.

The railways have been more fore-handed within the last four years. Their investment in road and equipment—allowing for retirements of property—has been about \$2,400,000,000, or 600 million dollars a year. Considering the poor earnings the roads have made and the general financial conditions, they have made very creditable progress. The increase in the tractive power of locomotives has been about $10\frac{1}{2}$ per cent and in the capacity of freight cars about 5.6 per cent. While railway officers recognize the need for continued expansion of facilities they are practically unanimous in expressing the view that the railways will be able satisfactorily to handle any increase of business that may come in 1925.

The recent performance of the roads in moving a record-breaking business while maintaining substantial surpluses of locomotives and cars seems to justify this optimism. It is evident, however, that this optimism is not based upon the anticipation of any such increase in traffic as normally occurred before the war. Even between 1903 and 1913 the average increase in ton-miles was thirteen billion annually, or thirteen times as great as the average annual increase between 1920 and 1923. How well the railways would be able to handle such an increase in traffic as was normal before the war we will not know unless and until such an increase comes. In view of past experience, however, it is evident the railways are justified in going ahead, in anticipation of increased business, in making as large capital expenditures for improvements and expansion as they can.

Railway Problems and Outlook

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Railway Problems and Outlook

Railway executives and supply men optimistic regarding future—Probable increase of traffic—Large expenditures for improvements will continue

IN response to requests made by the *Railway Age* several of the leading railway executives of the country, and also some leaders of the railway supply industry, have presented in short articles their views regarding the business outlook and transportation conditions and concerning some of the major problems of the railroads and their proper solution. The views expressed are uniformly optimistic.

In asking for these articles we requested some of the writers to deal with specific questions which we suggested to them. For example, C. H. Markham, president of the Illinois Central, was asked to especially give his views regarding the need for a continuance by the railroads of public relations work; Sir Henry Thornton, chairman and president of the Canadian National Railways, to say something about the railway problem of Canada; R. H. Aishton, president of the American Railway Association and chairman of the Association of Railway Executives, to give his views particularly regarding what one thing is most needed to bring about a practically permanent solution of the railroad problem; L. F. Loree, president of the Delaware & Hudson, to give his views regarding "how much of an increase in business the railways could handle with existing facilities if these facilities were utilized as fully as practicable and how a fuller utilization of them should be secured"; E. M. Herr, president of the Westinghouse Electric & Manufacturing Company, to say something about the prospects of electrification of railroads; G. M. Basford, president of the G. M. Basford

Company, to discuss "locomotives for business purposes," and W. W. Salmon, president of the General Railway Signal Company, to discuss the need and prospects of increased railway signaling.

It will be seen that those upon whom these requests were made have complied with interesting and constructive articles.

In addition, we submitted to a number of railway executives a questionnaire asking for their views regarding the following matters:

1. Probable increase of traffic in 1925.
 2. Probable ability of the railways to handle satisfactorily the increased traffic in prospect.
 3. How much will capital expenditures probably be in 1925? Will these expenditures be made relatively more largely for equipment or for enlargements and improvements of fixed properties than within the last two years?
 4. To what extent is it possible and sound economically to stabilize employment in railway service, and what is most necessary to make possible increased stabilization of employees.
 5. In a general way, how far is it desirable, from the standpoint of both the railways and the public, to carry the consolidation of railroads?
 6. What one thing is most needed to bring about a practically permanent solution of the railroad problem?
- The answers made by railway executives to this questionnaire constitute an interesting and valuable symposium upon the present and prospective railway situation.

What is Most Needed to Solve the Railroad Problem

By R. H. Aishton

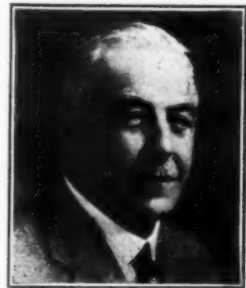
President, American Railway Association; Chairman, Association of Railway Executives

"WHAT one thing is most needed to bring about a practically permanent solution of the railroad problem?" Paraphrasing an old Mother Goose rhyme I would say that this is the answer to the above question—

"But leave them alone and they will come home
Dragging their trains behind them."

And I am referring to railroads. More than anything

else they need to be left alone and to develop their service as any other industry is permitted to do. For the past two years the carriers of the country have given to the patrons of their facilities a transportation service unequaled in history. This was accomplished not as a result of, but in spite of the strict system of regulation in effect. The carriers have asked that the Transportation Act in its fundamental and



cardinal provisions be left unchanged and submit that the unparalleled transportation service of the past two years has justified such a conclusion.

If the efficiency of the railroads is to be measured, what better test of their efficiency can be found than the service they render to their patrons? Designed and operated to render to the shipping public an adequate and efficient service at the lowest possible net cost, the railroads of the country may safely challenge comparison with any other industry or public endeavor from any standpoint,—whether it be efficiency, economy of operation, or any other test.

Illustrative of this is the high standard of service rendered to the public during the year 1924 at a relatively lower net cost to the public than the service rendered in 1920. Since 1920, the year following federal control, nearly a billion and a half dollars have been returned to the shipping interests of the country through the medium of rate reductions. While this saving is a tangible thing and can be definitely measured there is in addition to that saving a further saving in interest charges on goods in transit due to more speedy service, an appreciable reduction in necessary inventories plus the certainty of the quality of service that has been rendered in the past year.

It has been suggested by some that the "Leave them alone" policy is one lacking the elements of constructive suggestion. The carriers, however, feel confident that

they are fully supported in claiming this policy to be fundamentally sound and constructive by the record of what has been accomplished, and in the light of this accomplishment submit that transportation questions are economic questions that are not satisfied by political answers, and furthermore, that there is no condition existing today which calls for any urgent legislative action by Congress with respect to the railroads.

The terms of the Transportation Act, under which the railroads are now operating, are predicated upon "honest, efficient, and economical management." The record of the past two years has completely demonstrated the efficiency and economical character of management. The railroads of the country are also under honest manage-

ment. Leave the railroads alone to meet the problems which face them, but also let the people of the country believe in their railroads. These transportation systems were built with money from the savings of the people. They are operated for the benefit of the people. The men and women employed in railroad service and those in positions of management are men and women in whom the public can have confidence and who are worthy of reliance in their integrity.

Railroad service is honest service and should appeal to men and women of the highest capacity. Railroad employment should be attractive to ambitious and capable young men and women. Let the railroads alone, to be sure, but believe in them, also.

Favorable Public Opinion Essential to Railway Success

By C. H. Markham

President, Illinois Central

RAILWAY success today and for the future must be based upon a judicious combination of deeds and words. It is not enough for a railroad to attend to its own business and to please its customers to-



day by providing service that is both efficient and cheap; it must make secure its future by recording that performance in the mind of the public, so that no one will question its right to a fair return that will attract investment. The railroad must tell the public what it intends to do; it must do that thing to the very best of its ability, and then it must record the achievement in the public consciousness, so that the good im-

pression will not fade out and be forgotten.

The big thing, of course, is performance, for the railroads exist only to give service. Nothing must be allowed to conflict with adequate service to the public. Business is hampered, labor is unemployed, the prosperity of the country is set back when railway service fails. When the demand for transportation exceeds the supply, that fact stands out.

The most important problem with which the railroads are now confronted is that of keeping up with the growth of the country. Recently they have been doing that fairly well. The record traffic of late 1924 has been handled satisfactorily. Despite the recent heavy volume of freight business, the railroads have managed to keep their lines open and surpluses of locomotives and cars on hand as a guaranty of good service to the public. The accomplishment has been a magnificent one, but the railroads cannot rest on their records.

In the past the amount of business carried on in this country has increased at a rate greater than that of the population increase, due to the growing per capita requirements of our own people and the increased volume of our foreign trade. Nothing is more certain than that the amount of business carried on will continue to grow. The demand of the future places upon the railroads an obligation to equip themselves not only with cars and locomotives, but with additional trackage and other facilities, including grade revisions, that will make possible the more economical and more satisfactory transportation of the business offered.

In order for the railroads to meet this obligation, there

must be confidence. It will take confidence on the part of the railway managements to spend the large sums needed annually to improve and extend the railway properties, and it will take confidence on the part of investors to lend these large sums. The railroads must be allowed to realize earnings sufficient to protect and strengthen their credit. Since the termination of federal control they have not earned in any year the full amount of the fair return upon property valuation contemplated by the Transportation Act as interpreted by the Interstate Commerce Commission. However, in 1924 they have done very well in keeping their net earnings about stationary in the face of a substantial reduction of operating revenues, and there is hope that the public will allow them to benefit from the increased revenues which future increases in traffic will bring about and from the economies that are being and will continue to be made as the result of wise capital expenditures and greater operating efficiency.

Only the railroad that is making money is the railroad that can afford to keep its plant up to a standard well in advance of the needs of its patrons. The net earnings of the railroads will govern their ability to expand their facilities to take care of the country's growing commerce, but it is the state of public opinion which first determines the net earnings which the railroads shall be allowed to realize. It follows, therefore, that the creation and maintenance of a favorable public opinion is essential to railway success. It is in this connection that it becomes necessary for the railroads to translate their deeds into words.

Favorable public opinion can be courted and won only by a carefully considered and wisely administered program of public relations. Experience has taught the railroads that. The key to railway disaster in the past was to lose public confidence. The railroads lost it by failing, sometimes, to deal fairly with the public in the conduct of their business and by failing, more often, to give the public the facts upon which it could pass fair judgment of the railroads, their achievements and their shortcomings. More and more railway managements are coming to realize that the key to railway success in the future is to win public confidence today.

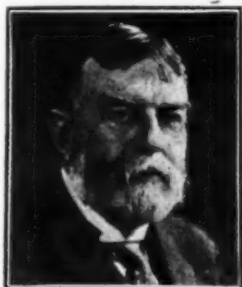
An important part of every railroad's work should be the cultivation of public confidence by the recital of achievements made and the promise of progress in the future. That work, I believe, will come to take rank with the work of running trains. In the final analysis, public confidence is the fuel that keeps the trains running.

Large Increase Needed in Railroad Capacity

By L. F. Loree

President, Delaware & Hudson

IT is very difficult to formulate an answer to your question as to "how much of an increase in business the railways could handle with existing facilities if these facilities were utilized as fully as practicable and how a fuller utilization of them should be secured."



There were in the United States on December 31, 1923, 248,816 miles of road. I am inclined to believe that 30,000 miles of this track should be taken up and abandoned as no longer economically justified and, of course, it presents no transportation congestion. About one-half the ton mileage of the country is moved on some 25,000 miles of main line

mileage and the transportation problems are almost exclusively located on this restricted mileage. I have an impression (and it is no more than an impression) that, taken as a whole, perhaps 25 per cent more business could be handled on this mileage in its present condition.

This margin is not sufficient to afford adequate protection. There have been years in which the revenue ton-miles handled exceeded those of the preceding year by considerable percentages. In 1906, 15.7 per cent; 1910, 16.6 per cent; 1916, 24.1 per cent; 1923, 21.8 per cent. Additional facilities cannot be hurriedly provided. The long narrow strip of railway property is very restrictive and new construction and major projects often run from two to five years. The few months in which the seasonal

conditions permit work in the open and the necessity of maintaining the traffic movement add to the difficulties. We can hardly feel comfortable with a margin of less than 50 per cent.

As to the latter part of your question, there should be a determined effort to secure a better use of the freight car equipment by raising the minimum weights, increasing the average load, increasing the average miles moved per day, utilizing the "sailing day" organization, increasing the siding facilities, whether furnished by the public or by private individuals, abolishing the use of trap or ferry cars, restricting the reconsignment privilege and the use of the "to order" bills-of-lading, reducing the time of repairs to bad order cars, and a readjustment of the demurrage charges, utilizing the experience of the California Demurrage Bureau.

A great deal remains to be done in modernizing our locomotives, both as to hauling capacity and fuel economy, and an increase of the power of the switching engines by remodeling and the substitution of road power. There should be an increase in engine terminal facilities, in passing sidings, and a steady enlargement and modernizing of yards.

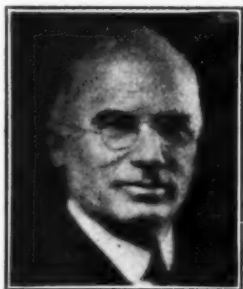
Perhaps the point in which railroad facilities are the weakest is in the machine tool equipment of the repair shops. The development of machine tools receives a great impetus from a war and from the growth of a new industry. During the last fifteen years we have had the World War and the development of the automobile business. The effect has been to revolutionize machine tools and to render obsolete a large part of the machine tool equipment.

Outlook for Stabilization of Employment Encouraging

By Daniel Willard

President, Baltimore & Ohio

1. WE are basing our estimates for next year on the supposition that our traffic in 1925 will be the same in volume as it was during 1924. As a matter of fact I personally expect it will be somewhat greater. I do not expect it will be any less.



2. I think the railroads will be able to handle satisfactorily all traffic that is likely to be offered in 1925.

3. Of course, I have no definite personal knowledge whatever concerning probable capital expenditures, except as to the Baltimore & Ohio. I am inclined to think our capital expenditures during the year 1925 will perhaps

be somewhat less than in the recent past and may be about equally divided between equipment and other facilities, with equipment, if anything, a little in the lead.

4. A committee of railway presidents has been appointed by the Association of Railway Executives to study the stabilization of employment, with instructions to co-operate with the Interstate Commerce Commission in such a study, and report back to the executive committee of the Association. Arrangements have already been made for assembling the information necessary in order that the

matter may be approached with a clear understanding and sound conclusions arrived at. I do not suppose it will be possible to absolutely stabilize railway employment on all railroads in the United States through all periods of the year, because of changing seasonal requirements. I do believe, however, that much more can be done in that direction by the railroads as a whole than has so far been done, and I think the outlook for improvement in that direction is quite encouraging. I am not in position to indicate in what way the improvement will come about because the information upon which such a conclusion must be based has not yet been assembled.

5. Consolidation of railroads should be carried just as far as it may appear economically desirable to do so. As I understand the matter, the inspiring thought behind the consolidation idea is that by consolidation, transportation costs may be reduced, which it is hoped would be followed by reduced transportation charges. I think that each particular group must be studied by itself in order to determine whether a proposed enlargement would be economic or not. I can certainly think of no reason for developing a group unless there was sufficient cause to believe that economies would follow. There is no reason for making railway systems larger simply that they may be larger, while on the contrary there is much to be said in favor of systems of moderate size.

6. I do not suppose there will ever be any solution of

the railroad problem which may properly be considered permanent. I believe, however, that the present scheme of regulation provided in the Transportation Act of 1920 goes as far as is prudent in the way of regulation at the present time, and I believe if the existing scheme of regu-

lation is fairly interpreted and sympathetically applied—that is, applied with a desire to make it succeed—that the railroads will be able to operate successfully thereunder, railroad employment will be better stabilized, and the public served adequately and well.

The Railway Problem in Canada

By Sir Henry Worth Thornton
Chairman and President, Canadian National Railways

AS I have frequently stated, the railway problem in Canada, if it can be called such, turns entirely on increasing the population of the country. Canada represents an area somewhat greater than the United



States including Alaska. It has a population of slightly less than nine millions as compared with at least one hundred and ten millions in the United States. The Dominion possesses enormous natural resources, including all sorts of minerals, and great opportunities for the development of cheap water power. It would be hazardous to predict the ultimate cereal productivity of our western country, but it will exceed by far our present production. The Peace river area, which represents a territory of about 400 by 250 miles

(and only a small portion of western Canada), would alone produce six hundred million bushels of wheat a year if but 50 per cent of it were brought into cultivation.

None of these great natural resources are of any value unless there is the hand of man to turn them to useful purpose, and this needs population. If we had twenty-five million people in Canada we might have some difficulties, but our problems would have disappeared. Consequently it is easily seen that only by bending our united efforts in the direction of an intelligent scheme of immigration will we be able to solve our difficulties.

As a matter of fact, Canada offers much promise to men of middle age, or younger, possessed of reasonable capital. It is relatively easy to acquire a farm of substantial acreage from which a comfortable living can be made and something put by for the future. Any man whose ability is more than ordinary probably stands a chance of making more or less of a fortune, and I know of no country which offers better opportunities for the settler.

Better Understanding Will Solve Railroad Problems

By L. W. Baldwin
President, Missouri Pacific

1. NATURAL economic laws and the conditions of the times point to a normal increase in the volume of traffic in 1925 and it would not be surprising if the increase should prove to be considerably greater than is expected. Available sources of information indicate healthy improvement in all lines of industry and business. So far as can be determined now, there is no reason to believe conditions in industrial and population centers will be less favorable than they have been in the last year, when labor generally was steadily employed at good wage rates. In addition to that, the American farmer is today in the



best economic position he has enjoyed since the readjustment process following the war. As this is written, a report of the U. S. Department of Agriculture shows the purchasing power of the farmer's dollar to have returned to an approximately normal figure, or to be exact, 95 cents, as compared with a low level of less than 70 cents a little more than two years ago. Not only has the purchasing power of the farmer's dollar returned—the farmer has a great many more dollars to spend. This naturally will result in increased business activity, especially throughout the Middle West.

2. Personally, I feel satisfied that the railroads generally will continue to provide an adequate and dependable service for any reasonable volume of traffic offered.

3. This will require larger capital expenditures per-

haps than were made either in 1923 or 1924. So far as the Missouri Pacific is concerned, we are making our plans with this in mind with a view to increasing in approximately the same relative proportion our expenditures for both equipment and for enlargement and improvement of fixed properties.

4. With regard to the possibility of stabilizing employment in railway service, I subscribed to the recent pronouncement of the Association of Railway Executives embodied in the resolution adopted in New York in September. The task presents many difficulties but I feel certain much can be accomplished along that line, particularly in respect of repairs to locomotives, and great good can come of it.

5. Regarding the question of consolidation of railroads, the record of the Missouri Pacific speaks for itself. There should be no legal bar to logical and natural consolidations when these can be worked out voluntarily to the mutual advantage of the properties involved by the respective managements. The Missouri Pacific has adopted a policy in this matter that is generally understood, I believe, and one which I am naturally convinced is economically sound.

6. It is most difficult to point out any one thing that is most needed to bring about a permanent solution of railroad problems, principally because there are so many questions which need to be solved and because the one thing that might solve one problem would not affect others. In a general way, however, I believe it can be safely stated that one of the things which will go furthest toward bringing about a permanent improvement in the railroad situation is a better general understanding of that

situation. If the investing public, the shipping and traveling public, the employees and the managements themselves all understand the underlying fundamental economics and this understanding is fortified with an adequate fund of general information, I believe our so-called problems will largely disappear. In order to bring about this greatly to be desired condition of affairs, it is necessary for the managements to devote their best efforts to this end, as well as to the practical problems of obtaining and handling the traffic and the problems of finance.

The Missouri Pacific has had some success along this line. Definite efforts have been made to inform both the public and the employees about these matters. We have discovered that with such an understanding there comes an enthusiastic determination to improve the situation. The public responds with more sympathetic co-operation and helpfulness, realizing the advantages of adequate and dependable service. Employees respond because they realize

practical advantages to themselves and, I am convinced, because there is in the heart of every man a desire to think right and do right.

I believe, partially as a result of our policy in this respect with the assistance of employees of every degree, the Missouri Pacific has been enabled to obtain a constantly increasing volume of traffic. The intelligent understanding on the part of the employees makes them eager to render the most and best service possible and this naturally satisfies the interested public.

The management of each railroad must solve its own problems of supervision in its own way. Our method includes the closest personal contact all along the line.

I firmly believe the developments of the last few years along this line are a healthy indication of a changing sentiment with regard to the railroad situation and this fact in a large measure strengthens my belief that the year 1925 will be the most prosperous the railroads have enjoyed.

Proposed Changes in Labor Provisions a Menace

By W. J. Harahan

President, Chesapeake & Ohio

1. BUSINESS conditions warrant the belief that there will be a normal increase in our traffic in 1925. It does not seem to me that it will be a boom year, but should be a good year.



2. We will be able to handle satisfactorily and efficiently all traffic that may be offered to us. We are making *service* the keynote of our operations and we discover many advantages accruing from rendering first-class service that cannot be foreseen until such a plan is put into effect to the fullest extent.

3. This company expects to make large capital expenditures in 1925. Such expenditures will

be in greater proportion for the enlargement and improvement of fixed properties, as compared with expenditures for equipment, than has been the case within the last two years, and in fact for many years. For the proper development of the railroads it is essential that facilities be well balanced, as the absence of any part of the necessary facilities prevents the full utilization of other facilities. For instance, if you do not have sufficient shops you cannot get the full use of locomotives and cars; if you do not have sufficient running tracks and yards you cannot get trains over the road as efficiently as practicable.

4. I feel it is possible and sound economically to stabilize employment in railway service. Of course, the necessary thing to bring about stabilization is the earning by the railroads of sufficient net income to allow them to keep their tracks and equipment in the condition necessary to economically and efficiently handle their business. The officers of this company have been earnestly addressing their thoughts to the question of stabilization for a number of years and have achieved quite a considerable advance in that direction since July 1, 1922. We have made as accurate figures as practicable to enable us to determine the expenditure which is required to keep our equipment and track in proper condition and we expect to endeavor to stabilize our operations so as to meet each year the expenses thus determined. One of the most important things necessary to do in order to bring this about is the creation, under proper supervision, during the prosperous years, of a reserve fund, so that during the lean years it

can be drawn upon. To do this it will be necessary for the Interstate Commerce Commission to make a ruling different from that now in effect.

5. I think it advisable that there should be a certain amount of consolidation of railroads and I think the government should go as far towards encouraging consolidation as it reasonably can, but I do not believe that any sound, healthy consolidation can be brought about except as it is done naturally, as the result of economic conditions. The government, in its application of the anti-trust act, halted consolidations for a good many years, until the time that the Transportation Act again encouraged them. I think the government should continue that encouragement, but I do not believe the best results can be accomplished by making it compulsory. I think there is one danger that should be carefully avoided in consolidation and that is not to get such large units that there cannot be economy in operation, because of the impossibility of supervising such units properly.

6. I think that the one thing most needed to bring about a practically permanent solution of the railroad problem is a stabilization of the railroad laws to cover return on the investment. I think the people have come to recognize the fact that it is very much more to their interest that the railroads should have a reasonable return on the investment, thus allowing economical and efficient operation, and the building up of credit for necessary expenditures, rather than a contrary policy, because they have had the bitter experience of having their own business slowed down by railroad stagnation, brought about by uneconomic decrease in rates.

I think one of the most serious menaces we have today is the proposed change in the labor provisions of the Transportation Act. I think the public is entitled to representation upon the body which deals with these questions; in fact, I am of the opinion that perhaps there should be only representatives of the public on the Labor Board, instead of as it is now constituted.

Another important question, which I think should be carried to a conclusion, is the endeavor to bring about the best possible co-operation between the railway company and its employees, the idea being that we will endeavor to build up a spirit on the part of the employees which will insure proper consideration by them of the difficulties of management and which will assure their feeling always that they are being treated fairly.

Present Principles of Regulation Are Sound

By C. E. Schaff

President, Missouri-Kansas-Texas Lines

1. GENERAL business conditions in the Southwest are substantially better than they were a year ago, as a result of splendid grain and cotton crops, with increased prices yielding farmers a better return and enlarging their buying power. Increased traffic in the forepart of 1925 may therefore be anticipated, but the volume of traffic for the year in Southwestern territory will be contingent on crop conditions, as the season advances. With agricultural production equal to that of 1924, traffic should show some increase.



2. The experience of the railroads this year indicates that they should be able to handle such reasonable increases in traffic, as are in prospect, as satisfactorily as has been the rule in 1924.

3. M-K-T capital expenditures have been relatively large over a period of years, and our program for 1925, therefore, will not be extensive, the major expenditures in prospect being for new equipment and the improvement of that already owned, rather than for the fixed property.

4. It certainly is economically sound to stabilize railroad employment, and highly desirable. What the railroads may be able to accomplish toward this end is contingent on the degree of co-operation they receive from regulatory authority and the shipping public. Stabilization of traffic and revenues will influence stabilization of employment. Uniform traffic movement, rather than heavy seasonal movement, will help greatly, and security against drastic rate reductions curtailing revenues would likewise influence retention of forces at something like a level.

6. As a matter of fact, stabilization of revenues, with continued observance of the principle that rates and railroad expenses are so definitely related that neither can safely be disturbed without careful consideration of the other, will do more to develop a permanent solution of the railroad problem than any other one thing. Our experience during the past four years has demonstrated that the problem is relatively simple and that the principles we have observed since 1920 are sound. Understanding on the part of public men that the public will not permit abandonment of these principles, will develop a confidence on the part of investors and railway managers that will result in continued improvement of our railroad situation.

How Increased Efficiency Helps Handle Traffic

By S. M. Felton

President, Chicago Great Western

1. I LOOK for an increase in traffic for the first six months of 1925. For the last six months I doubt if we will more than hold our own but the sum total will be an increase in the year 1925 over that of 1924, at least in my judgment.



2. I believe the railroads will satisfactorily handle the increased traffic. When you consider the increased daily mileage of freight cars and the increased mileage of locomotives you will appreciate how flexible the situation has been. Take our own case. In 1920, the last month of government administration, our freight cars averaged but 21 miles a day. Last month they averaged 44.7 miles. This on our freight car

equipment is the equivalent of 11,500 additional cars. Our freight locomotives in February, 1920, averaged 68.3 miles per day and last month they averaged 86.2 miles, which means the equivalent of 36 additional locomotives. Because of this improvement we have not been under any pressure for locomotives or cars. If we had a greater demand we would simply get more mileage out of our equipment. We have not reached the limit. In the case of the railroads as a whole, the average miles per car per day in February, 1920, were 22.3 miles. In August, 1924, the last month's reports we have, they averaged 26.7 miles. This is equivalent to approximately 500,000 additional cars.

3. The capital expenditures authorized for the years 1923 and 1924 by the carriers of the country aggregate \$2,136,446,426, or an average of \$1,068,223,213 per annum.

I believe that the capital expenditures in 1925 will be at least equal to the average of the two years. Since the railroads of the country have been able to speed up the movement of their equipment and have finally restored it to normal conditions they will not spend as much in 1925 on equipment as they have been spending in previous years. In my judgment more money will be spent for other improvements.

As far as the Great Western is concerned, however, our capital expenditures will be limited to approximately \$424,000. This is less than in 1924. Our situation is that we have no way to provide additional capital beyond what we save over and above our fixed charges. We have been expending all surplus earnings. As soon as we re-establish our credit and can get our bonds to a point where it will be advisable to sell them we shall undertake some capital expenditures in the way of grade reductions, but that will not come in 1925.

4. A committee has been appointed to consider the question of stabilizing employment in railway service. The matter is receiving very careful attention and it is desired, on the part of all railway officers, to stabilize employment as far as possible. The great trouble is our wide fluctuation in business and consequently in our earnings. Our rates are not high enough to enable us to build up a reserve fund in the good months of the year to justify a continuance of our employment in the lighter months. We should be able to work our shops continuously and that is where the greatest opportunity to stabilize employment occurs because in our track work it is impracticable to keep a uniform force at work the year around on account of weather conditions. In train service, of course, the employment depends entirely on the movement of traffic.

5. There are certain natural consolidations of railroads that should be undertaken and put through. Those would be what I term voluntary consolidations and there ought not be any delay in securing the approval of the Commission for such consolidations, but an attempt to force consolidations where they are not desirable and are not considered advantageous by the railroads in interest is, to my mind, of doubtful benefit to the public.

6. The thing most needed to bring about a permanent solution of the railroad problem is to take the railroads out of politics; for the Interstate Commerce Commission to see that they are provided with the fair return on their properties contemplated in the Transportation Act. If the railroads were permitted to earn the return specified in the Transportation Act the railroad problem would be

a long way on the road towards a permanent settlement, but to provide for a return of $5\frac{3}{4}$ per cent and to so fix rates that a certain group of railroads cannot earn over 4 per cent will never solve the problem. It seems that if we have a few months of prosperous times and good earnings there is a clamor at once for a reduction in our rates. No one thinks of the lean months. No one considers that interest, dividends and other obligations cover the whole year and they must be earned for the year as a whole and not for the few months in which satisfactory results are secured. If we had a permanent solution the railroads would go ahead and provide facilities for the future growth of business, which the majority dare not provide at the present time because of the uncertainty of their net return.

Undue Combinations Apt to Defeat Public Interests

By E. J. Pearson

President, New York, New Haven & Hartford

1. INDICATIONS are that the traffic in 1925 will hold up to that of 1924; with the possibility of an increase from 2 to 3 per cent on the New York, New Haven & Hartford Railroad.



2. The New Haven has sufficient transportation capacity to handle satisfactorily a very considerable increase in traffic over the best records of previous years. The records of the railroads of the country in the past year are such that there should be no question of their capacity to handle any business that may be offered in 1925.

3. Extensive capital expenditures are not necessary or in prospect on the New Haven in 1925. Perhaps \$3,500,000 will be expended, which will cover largely some further improvements in yard facilities and engine terminals, to-

gether with expenditures required by law, such as automatic train control, elimination of grade crossings, etc.

5. Combinations of railroads which provide natural traffic routes between the sections of the country which they serve may offer possibilities of increased efficiency, economy of operation, and improved service for the public. It may be found that certain lines serving particular territories, or which serve in a general way as a terminal within their territory for various other railroads, should be independently retained. Any consolidations should be worked out by the railroads themselves after careful study to insure the best results for all interests—the public and the owners. Undue combinations are apt to defeat this purpose and should be guarded against.

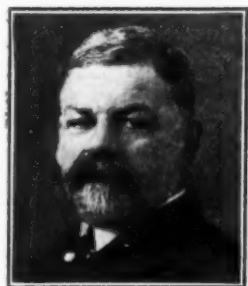
6. Generally speaking; a realization on the part of the public and those in public authority that the railways are absolutely essential in the development of the country and that they are entitled, the same as any other business, to a fair return upon the money invested in them and co-operative assistance from all to that end.

Railroads Can Adjust Themselves to Any Fair Requirements

By W. B. Storey

President, Atchison, Topeka & Santa Fe

1. SO far as the Santa Fe is concerned, there is a good prospect that during the first six months of 1925 freight traffic will be substantially heavier than the first six months of 1924 when business was decidedly slack; passenger traffic will probably be no heavier than in 1924. After July 1 freight traffic will depend largely upon whether crops are good or bad.



2. The railroads will be able easily to handle all traffic in sight if they are not crippled by some untoward and now unforeseen happening.

3. Santa Fe capital expenditures for additions and betterments will probably be about on a par with 1924, although its budget has not yet been completed. Equipment orders will be less, consisting chiefly of freight cars. Even with the peak loading the railroads showed a goodly surplus of

freight cars so it is plain that large additions would not be warranted.

4. Due to wide seasonal fluctuations in traffic there will always be of necessity considerable variation in employment. Furthermore, there is a great volume of work on a railroad that has to be done in season. The most necessary thing to stabilize employment in railway service is sufficient credit and earnings to permit them safely to carry through to a conclusion their adopted program of work, without having to take in sail with every fluctuation in traffic.

5. Consolidations are desirable wherever properties integrate well with one another. In all such cases there should be a saving in expense by doing away with duplicate organizations and facilities. Consolidations should not be carried to a point where the organizations become unwieldy nor should they be made where the properties do not integrate advantageously. The true welfare of the railroads and the public is identical in this matter, and if consolidation is not beneficial to the public it will not be so for the railroads.

6. The real railroad problem is to get the people of this country first, to understand that transportation is a question of economics, not of politics, and second, in dealing with this economic question to gain a sound grasp of its fundamentals. In the last session of Congress upwards of 200 bills were introduced designed to change the legal status of the railroads in almost every conceivable particular. So far as each one of these bills represented a public demand for change it indicated an ignorance upon this question which needs honest, thoughtful, and clear discussion to dispel. Essentially the public is receiving good service at fair rates, the railroad employee is receiving proper remuneration under proper working condi-

tions, and the railroads are being fairly treated under the Transportation Act, 1920. One of the greatest handicaps under which the railroads had to labor prior to 1920 was the uncertainty bred of a succession of new and varying laws.

The legislative stability since the year 1920 has been attended with only numerous threats of substantial change. The railroads can adjust themselves to any fair legislative requirements and if the public would rest content with the establishment of such requirements there would cease to be a problem, as the adjustment would constitute the solution. However, whenever conditions are radically changed a problem again arises.

Railroads Must Keep the Public Informed

By W. R. Scott

President, Southern Pacific Lines

1. IT is impossible to tell what the traffic will be in 1925. Business conditions in the country will undoubtedly be more stabilized than they have been for some years, but the volume of traffic is so largely



influenced by crops in this country no forecast could intelligently be made at this time. Given good crops, we could probably look for a 5 to 10 per cent increase in business for 1925.

2. The railroads in the past two years have demonstrated their ability to satisfactorily handle all the traffic offering and this will undoubtedly be the case in 1925. This has been brought about by the active co-operation

of the shipping public through their intimate knowledge of the railroads' problems through the meetings of the Regional Advisory Boards, shipping and railway representatives at various points and times throughout the country.

3. Capital expenditures will probably be as large as in 1924 and will be both for providing more adequate equipment and for improvements in facilities.

4. It is quite possible and sound economically to stabilize employment in railroad work to a great extent. To do this it is necessary to disregard monthly income as a measure but rather consider the yearly income, and expenses should be continued with regularity throughout the year in maintenance of equipment and maintenance of way, so far as climatic conditions will permit.

5. The matter of consolidation will solve itself as time goes on and shows if and where consolidations are advantageous.

6. There will never be practicable any permanent solution of the railroad problem because there will always be some who will feel that they are able to handle the railroad problems to much better advantage than those who have been connected with it all their lives. The use of the railroad problem as a political football can best be avoided and the nuisance reduced to a minimum by the railroads keeping the public informed of their problems and how they are met.

Consolidations Will Be Helpful In Rate Regulation

By H. E. Byram

President, Chicago, Milwaukee & St. Paul

1. I THINK the outlook for an increase of traffic next year is favorable because of the improvement in business conditions generally, and especially in the Northwest, where there is a distinct improvement in agricultural conditions. The troubles of the farmers are not over by any means, but the improved crop conditions of this year have helped make a good start.



2. There is no doubt in my mind about the ability of the railroads to handle satisfactorily any reasonable increase of traffic. We have been successful during the past three months in handling the largest tonnage that has ever been handled without any car shortage, congestion or delays, and I believe the capacity of the railroads has not yet been reached.

3. It is very difficult to make a prediction as to the

capital expenditures for 1925. As there is a certain amount of capital that must be put into the properties each year regardless of the volume of traffic, I believe the expenditures for 1925 will at least be as great as 1924. The ability of the railroads to handle the traffic of the country the past two years without any difficulty does not indicate a pressure for equipment that is likely to lead to greatly increased expenditures in that direction.

4. The stabilization of employment in railway service is a subject that is only beginning to receive attention, and there is not enough data available to permit of the formation of any definite views as to the possibilities in this direction, although I think all executives realize the desirability of doing whatever can be accomplished practically in greater stabilization of railway employment.

5. Complete development of the consolidation program which is now being considered by the Interstate Commerce Commission is desirable both from the standpoint of the public and the railways. If the present method of rate making is to be continued it is evident that rate levels must be established which will bring satisfactory

returns to the railways of each territory as a whole, and consolidation of the railways in groups for the purpose of diffusing earnings from such rate levels among all railroads serving each district is essential in order to make possible the establishment of uniform rate levels for both the railroads and the public.

6. The acceptance by the people of this country of private ownership of railroads as a permanent policy and the recognition of the fact that the railroads to be suc-

cessful must be accorded earnings which will produce satisfactory returns to their owners, making it possible for them to secure necessary capital to make improvements to their equipment and facilities so as to keep abreast of the transportation needs of the country at all times. Unless the railroads are permitted to prosper they cannot acquire their maximum efficiency nor anticipate the constantly increasing needs of the country for transportation by providing facilities as and when they are needed.

The Railroads and National Prosperity

By Samuel Rea

President, Pennsylvania Railroad System

THE American people have little time to deal with the past, but are always interested in the future outlook. It is a national trait that when an important improvement is suggested requiring years to bring

it to a conclusion, or when suggestions are made on a very far-reaching topic, like railroad consolidation, the labor, cost and time that must elapse before the project is consummated are generally forgotten if it appears to be an attractive program.

The same general trait appears with regard to the outlook for the new year. All that business men can do is to scan the horizon so far as they can see and summarize

the situation based on their experience. The American people like the outlook to spell "prosperity," and their leaders like to forecast prosperity, and the people rarely blame the business man for failure if his diagnosis is incorrect. Yet failure to forecast the course of the year's events correctly is almost as universal as weather forecasting by an almanac. With these preliminary statements I am willing to hazard a guess on the year 1925.

The railroads are interested in good business because they make their revenues from hauling the traffic which represents the output of the business activity of the nation, but they themselves are one of the most profound influences on business. They are among the country's greatest taxpayers. They consume probably one-quarter of the lumber output, one-third of the iron and steel output, one-third of the coal mined, and an important percentage of the output of practically every basic industry of the country.

They spend a billion and a quarter dollars annually for materials and supplies (exclusive of fuel) and about three billions for wages. Another billion dollars is spent by the railroads for extension of facilities and new equipment in every good business year like 1923. Therefore, altogether their effect on the prosperity of the country is very far-reaching. To enable them to continue such a program of expenditures and employment, the necessity of allowing them to earn a fair return, and maintain their credit and purchasing power in the strongest condition, and provide adequate transportation, is one of the paramount issues of the country. Weak railroads make an unprosperous and discontented nation, and are most hurtful to the farmers and industries.

We have just passed through a presidential election year, and have experienced the usual unsettlement of business and of the public mind. Having ample capital, and at relatively low rates, and with foreign and domestic conditions continuously improving, a lack of certainty as

to the election results was the chief reason for even a temporary reduction in business and traffic.

The railroads gave a remarkable exhibition in increased efficiency both in 1923 and 1924. Yet the railroad business of the country for the first nine months of the present year showed a decrease of 8.9 per cent in net ton-miles over the same period of 1923. What is more serious is that the property investment, represented by railroad and equipment, materials and supplies, and working capital, of the Class I railroads of the country, which are owned by the citizens and their institutions, representing over twenty-one and a half billion dollars of investment, earned a return only at the rate of 4.21 per cent per annum in those nine months. Even in the busy year of 1923, when all records for freight traffic were broken, the return was only at the rate of 4.43 per cent per annum on this large investment.

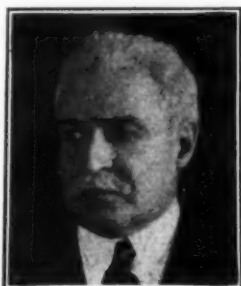
Among the reasons for the lack of greater traffic in 1924 has been the heavy falling off in soft coal traffic, caused by fixing the scale of union wages so high in the Pennsylvania and other soft coal fields, that they could not compete with the non-union fields. As a result very many men in the coal fields did not have regular employment, and the railroad traffic on many roads in the Eastern District suffered accordingly. This has been another factor affecting stabilization of railroad employment and railroad service.

If the 5¾ per cent rate of return on the property investment of the railroads, allowed under the Transportation Act, had been realized in 1923, the railroads would have had nearly \$300,000,000 more to apply to the improvement of their property so as to give better service and stabilize their credit. The horizon for 1925 is viewed by the railroads in no pessimistic attitude, but we must keep these facts before us, and also realize that personal and governmental economy—city, state and federal—is essential, and tax reductions a pressing necessity. Then foreign competition and crops must find a place in the 1925 picture in determining whether we should forecast good results.

However, the conditions are all set, as far as we can now see them, so that the year 1925 should show an improvement in industry and traffic over 1924, and if fair legislative treatment and regulation is accorded the railroads, and we have satisfactory labor conditions generally, and rate tinkering is avoided, that improvement should be realized. Their credit will not be fully restored until the public shows a readiness to buy their capital stock issues.

Railroad consolidations are on the horizon. With the opportunity for fair earnings, and with encouragement from a legislative and regulative standpoint, those natural consolidations that tie one railroad to another should proceed, always remembering the danger of paper-made or legislative-made artificial groupings.

On this subject it is well to remember there exist in



the United States about 22 naturally formed systems which now perform approximately 85 per cent of the railroad transportation service of the country, and receive a corresponding proportion of the gross earnings. The general trend and policy of railroad consolidation ought to be to tie the various remaining lines into these important systems. This can be done without closing traffic gateways or causing such a rupture of natural trade and financial channels, with resulting confusion and disturbance to commerce, as would wipe out the benefits otherwise to be expected. Railroad consolidation has always gone on rather actively when the laws permitted and earnings were favorable, and it will do so again.

One thing most seriously needed to bring about a permanent solution of the railroad problem is, in my judgment, a far-reaching relief from legislative and regulative burdens. It is useless to blame federal or state commissions for burdensome regulation when we allow laws to be passed which make it the duty of these commissions to carry such measures into effect. My plea is for sanity and conservatism in railroad legislation and regulation, so that economic and natural business forces may have freer play, and that the railroads, and especially their rates, shall not be used as a means of unsettling business or paying political favors, or trying to help one section of the country at the expense of another.

It is my profound conviction that the nation desires the best possible railroad service and is willing to pay for it. If our governmental policies are shaped to that natural condition of the public mind, railroad rates will be left undisturbed until fair returns are realized, and political tinkering with railroad wages and working conditions will also be avoided. Railroad net returns should be allowed to reach at least the $5\frac{3}{4}$ per cent permitted under the Transportation Act. Under the improved conditions which would result, the railroads would be certain to spend a billion dollars or more annually

for improvements and extensions to their properties.

Our country's railroad systems, and the methods of dealing with traffic from its receipt to its delivery, are still in their infancy, and the greatest barrier to progress has been the continued obstacles in the way of allowing the railroads to earn a fair return. Adequate transportation is an impossibility without the assurance that a fair return on the investment is to be permitted regularly.

Since 1916 the Class I railroads have increased their investment in road and facilities devoted to public use by about \$4,000,000,000. During this period the largest net railway operating income of these roads was \$962,000,000, earned in 1923. Yet, notwithstanding the more beneficial features of the Transportation Act, and a greater public desire to accord the railroads better treatment, these returns for 1923 fell short by over \$78,000,000 of equaling the net returns of the year 1916, despite the large addition to capital investment made in the interval and the greatly increased volume of public service rendered.

The railroad owners and managers are determined to keep the railways efficient and progressive, and to get the full co-operation of their employees; but they will be able to provide the essential service and improvements only in so far as it is made possible by securing adequate net returns and an opportunity to exercise free initiative. Taken as a whole, the railroads will better promote the prosperity of the country when they have opportunities to administer their affairs in the light of business experience and knowledge, just as is granted in all other avenues of industry or commercial enterprise. The railroads do not ask to be let alone; they ask for the chance to earn fair returns and for free play to do their best work. Remove them, and keep them removed, as far as possible, from the realm of political exploitation and experimentation. Believing, as I do, that such is now the growing opinion of the public, I look forward to the future with greater confidence.

Danger of Harmful Interference With Regulation by Commission

By E. E. Loomis
President, Lehigh Valley

THE outlook for 1925, in my judgment, is distinctly encouraging. With the hopeful conditions at home and abroad, I look for a general stabilization of business which will, I feel certain, insure a steady



traffic for the carriers throughout the year. The railroads themselves will make an important contribution to the business situation, not only through their large expenditures for new equipment and facilities, always an important factor in our national prosperity, but through the economic aid they are giving as a result of the character of service they are performing. Business and industry, thanks to the rail-

roads, no longer must tie up great sums of capital in large stocks of materials and supplies, relying as they may upon prompt delivery of whatever the roads are called upon to handle. The coming year, I believe, will reveal a vast improvement in the banking and credit situation which this condition has brought about.

Capital expenditures of the railroads in 1925, in my judgment, must largely depend upon conditions, particularly as they manifest themselves in Washington. Never

before, I believe, has there been a better understanding and spirit of co-operation between the railroads and the Interstate Commerce Commission. I think I voice the opinion of most railroad men when I say that the cheerful prospects confronting us at the moment are in no way endangered by what we may expect from that body, provided they are left free and untrammelled by new legislation.

Apparently, however, there is a tendency upon the part of many congressmen to seek to take from the Interstate Commerce Commission many of its present functions, or at least to indulge in an orgy of directions as to how it shall proceed in various matters.

Bills taking from the commission any discretion in permitting railroads to meet water competition by charging less for a longer than a shorter haul, ordering the commission to abolish the Pullman surcharge and to compel the issuance of reduced rate mileage books, commanding a general freight rate inquiry, particularly with regard to a readjustment of the charges for handling agricultural products, etc., are the sort of thing to which I refer. The commission is not only able but should be permitted to decide these matters without political interference. The study the commissioners have given to these matters has indicated that they are seeking to decide them in a way which will be fairest to all concerned.

Fortunately, the labor situation of the railroads, it seems to me, is better than it has been for a long time, and I am distinctly hopeful that the study now in progress, under the direction of the Association of Railway Executives and the Interstate Commerce Commission, looking to a stabilization of employment and the elimination, as far as possible, of seasonable fluctuations in this respect, will develop ideas which can be put into practice.

Consolidation of railroads, I believe, can be brought about successfully only through voluntary mergers, where they follow natural trade lines and promise greater operating efficiency and better service for the general public. Both efficiency and good service must suffer, however, where systems are built upon too large a scale, making it impossible for an executive to know his line with that intimate acquaintance which is necessary to proper supervision. This is a situation which railroad men understand, and it is to be hoped that they may be permitted to use their good judgment in these matters free from the hampering details of plans for the arbitrary consolidation of the lines into a limited number of systems.

I do not believe there are railroad problems today which require legislative assistance in their solution. I think, however, there is a general disposition more and more to appreciate the country's dependence upon efficient transportation. The Shippers' Advisory Boards, which have recently come to occupy such important positions in the transportation field, have given business men a better understanding of the railroad situation and shown them ways in which they can help the carriers and themselves. Rep-

resentatives of farmers, millers, miners, manufacturers, and merchants get around the table with railroad men under this plan to solve their problems. The result has been most salutary.

The question of railroad taxes continues acute. There has been no stoppage in the steady increase year after year in the amounts the carriers must pay to states and municipalities, and this item is now of enormous proportions. The railroads are paying taxes at a rate of approximately \$1,000,000 a day. This question of taxes demands the interest of every citizen, whose duty it is to see that all governmental expenses are handled with the same economy and system which characterizes the expenditures of any business enterprise.

Matters of government generally warrant an increasing interest from business men. In the last election we saw what can be accomplished when the thinking people of the country are properly aroused. It is important, however, that this interest in governmental affairs be kept alive, that there be no slipping back into the same old apathy which has so long left this vital subject almost solely in the hands of politicians.

A new Congress has been elected which, in my judgment, may be expected generally to represent the views of the people of the nation. I think it is incumbent upon all to watch their work, to keep them regularly advised as to their views and to show them their appreciation whenever warranted. If this is done honestly and conscientiously, I believe we will have one of the best ways of finding a permanent solution of the railroad problem.

Making More Friends for the Railways

By L. A. Downs
President, Central of Georgia

THERE is general recognition of the fact that the support and co-operation of the public is the thing most to be desired in assuring the future welfare of transportation. The recent national election



has increased, rather than lessened, the necessity for maintaining proper public relations, because it has given the railroads an opportunity to fulfill efficiently their obligation to supply adequate and dependable transportation; and to justify public expectation of satisfactory service.

Support and co-operation from that portion of the public which travels and ships by the railroads may be termed friendship or good-will. Support and co-operation from that portion of the public in the employ of the roads is known as loyalty or morale. It is timely to give some thought to the methods whereby good-will may be created and loyalty stimulated. The broad principles of this work are well understood and generally practiced. It is well, however, to give attention to certain details, sometimes mistakenly considered as of minor importance, in dealing with both patrons and employees. Several railroads have adopted the policy of issuing statements through the advertising columns of the press at regular intervals. It is not infrequent for these statements to close with some phrase such as "constructive criticism and suggestions are invited." Experience has shown that numerous replies follow such invitations. Some of the criticism and suggestions are helpful, some are impracticable, but all

should receive careful attention, prompt investigation and courteous answers.

Arguments against such invitations for criticism have been advanced on the ground that they encourage complaints; but granted that they do, is it not better for those who have complaints to write them to the executive of the railroad concerned rather than to voice them on the streets or nurse them in silence? It is astonishing how many of these differences can be cleared up satisfactorily and how few, if indeed any, need be left without improving the situation.

Employees should be encouraged to talk over matters of this nature. An effort should be made to give a full explanation of the circumstances in each case, with the thought in mind that many things which are like A, B, C to the railroad man are Greek to the man on the outside. The normal man is reasonable and can be convinced of the desire on the part of the railway management to deal fairly. This method of handling may require long letters and several of them, but should result in concluding the matter in a manner satisfactory to all.

Employees should be encouraged to talk over matters affecting their happiness and prosperity, as well as questions concerning their work, with their immediate superiors. Why should not railway officers express an interest in the things that are near the hearts of the men and women in their employ? For instance, such topics as home ownership, savings accounts, keeping out of debt, promotion, and the like, might profitably be discussed in person and by letter.

The same careful handling and attention to detail should be given to correspondence with employees as to that with patrons. Railway employees are responsive to

the human touch. As a rule they have respect and esteem for the man over them. This feeling will grow if they find that their superior officers are ready and willing to deal with them on a basis of sympathy and understanding. Such a plan will not prove subversive of discipline, but, on the contrary, should arouse a co-operative spirit, establish a personal contact, and create friendship in a manner which will be reflected in the operating results.

Such a plan is not suggested as a cure for every ill. It cannot be applied in a cold or formal fashion. It must

be a genuine expression of real feeling and not the adoption of a means to an end. If it is the former, it will show wonderful results with both the outside public and the inside public, because it will build friendship as arguments cannot.

There is a vast difference between convincing a man that you are right and making him your friend. Transportation needs the friendship of the public which ships and travels, and equally so of the public in its own ranks. "The way to make a friend is to be one."

How Politics Hurts Business

By F. H. Alfred

President, Pere Marquette Railway

EVEN at the risk of being reminded of the maxim of Holy Writ—"a prophet is not without honor, save in his own country, and in his own house," I will endeavor to give the *Railway Age* a forecast of the business of the railroads for 1925.



In doing this, it appears to me that one does not have to depend upon the inspirations attributed to the prophets of old. We have the experience of years and this experience boiled down into official statistics. These, then, can serve as guide posts in any wanderings into the fields of speculation. Experience has demonstrated that the Pere Marquette Railway is a fair measure to use

in any summary of business, and the territory the Pere Marquette Railway serves is equally a safe measure for the country taken as a whole.

Before demonstrating the truth of these two statements, it might be well to mention that the Pere Marquette Railway's territory is one of varied activities. This section is a large originating territory for traffic, and of this traffic food products form a goodly percentage. There is a certain stabilizing factor, therefore, in this condition, since there is less recession or progression in the demand for food commodities than in other traffic, the pangs of hunger being as insistent in good as in bad times.

Now, having set these premises down, perhaps the table which follows will serve as a guide in any further speculation. This table has to do with the tonnage handled by the Pere Marquette Railway during the present decade, the percentage of increase, the total tonnage handled by American railways, the percentage of the Pere Marquette's tonnage to the total tonnage of the United States, etc.:

Year	P. M. Tonnage	Percentage Increase	U. S. Tonnage	Percentage P. M. to U. S.
1915	11,362,000	.....	1,802,018,177	.63
1916	12,908,000	12.65	2,316,088,894	.55
1917	13,279,000	2.72	2,388,023,904	.55
1918	14,242,000	7.32	2,419,325,739	.59
1919	14,793,000	3.71	2,136,883,697	.64
1920	14,855,000	.40	2,267,561,580	.65
1921	12,796,000	13.93*	1,768,397,731	.61
1922	13,910,000	8.91	1,974,618,324	.61
1923	18,577,000	33.62	2,411,239,000	.77
1924	17,650,000 (Estd.)	4.99*	.....	...

* Decrease.

Now it will be seen that there is a difference in the percentage of variation in the amount of tonnage handled from year to year as compared with the aggregate for the entire United States. These variations are from .55 per cent to .77 per cent, or a mean of about .66 per cent for the United States over a period of years. They also show that the Pere Marquette's traffic volume of freight is on an upward trend.

Now the tonnage hauled by the Pere Marquette in 1924, based on an estimate for December, will amount to 17,650,000 tons in all. This, then, points that the total revenue tonnage for the United States will amount from a minimum of 2,000,000,000 tons to a maximum of 2,300,000,000.

The point that I wish to make is this: Every ton under the total of 1923, which was not hauled by the railroads of the United States, represents a loss to the railroad workers, the railroads, the business men of the country and to society as a whole. If we glance back to the early weeks of 1924, we will recall that the year opened with every indication for continued prosperity. The record for 1923, which was almost equal to the war year of 1918, the greatest in the history of American business, was actually carried over into January and the early part of February. Then certain political agitators began to worry about the common people. They were willing to shed their "political life blood" for the cause. They attacked business generally and continued in these attacks throughout the year. The consequence of these repeated attacks was that confidence was destroyed—and confidence is essential to prosperity. There is not an economist in America, whose word is accepted, but who assigns the business recession from the 1923 record to that for 1924 to this one reason—politics.

If the country, having established culpability for the business lull, could go into a court of justice and, having fixed the blame for the losses that society generally suffered, have damages assessed, there would be a line-up of political agitators in front of the offices of our referees in bankruptcy that would obstruct street traffic. These "friends of the people" would plead guilty of bankruptcy and ask for a fresh start in political life on a saner platform. We have, therefore, many political insolvents in our Congress for a short term.

Taking as a case in point, the loss in tonnage to the Pere Marquette alone was nearly one million tons at least from this cause. For the United States, it will be perhaps 200,000,000 tons. When this tonnage is worked up into manufactured articles it represents large figures, perhaps two or three billions of dollars.

There are indications that better times will return in 1925. There are several conditions that give greater hope for 1925 that were absent in 1924. There is still, as a retarding factor, the short session of Congress to delay the return of complete confidence, notwithstanding that the expression of the people of the United States clearly approved the policy of economy in government, the Mellon tax plan, and other major issues advanced by President Coolidge. The Congress which will go out of office March 4 next was not overburdened with approved and tried views on economics, and orthodox views, after all, are the only ones that spell success or keep the factory

whistles blowing regularly. The coming Congress has received definite instructions from the people. With the political element removed to a greater or less extent from business, we can arrive at certain conclusions for 1925.

We know that manufacturers have kept down their inventories to a minimum during 1924. That means that they will have to bring in raw materials to be manufactured at an early date. There is already a certain better movement of iron and coke into the industrial centers which should gain some impetus shortly. Distributors have been buying carefully. The manufacturers have shown the same caution in their production program and will soon have to start shipping to their distributors. That means a more balanced traffic for the railroads for some time. In this connection, too, it might be well to point out that manufacturers generally are depending more and more upon our railroads for prompt service. They are getting it. In this way, they do not have to tie up as much capital to carry on their business.

The year 1925 opens with a brighter outlook than the year 1921, when the Harding administration was inaugurated. The farmers have a greater buying power due to better prices. In 1921 they were passing through the period of price deflation and other conditions due to the aftermath of the war. There have been many readjustments in our price fabrics, too, and the European countries have advanced more toward a re-establishment. Taken all in all, 1925 gives promise for a better outlook than even 1923. We know of many orders in Pere Marquette industrial centers that are awaiting the new year for release. That is equally true for the entire country.

There is only the political element, then, in the way.

Four years ago the situation was more serious. It is well, if only to realize our mistakes as a nation, to recall how Secretary Hoover had difficulty in coaxing people back into spending money. They had had the idea of economy to the point of penuriousness riveted into their minds, fearing worse times. Secretary Hoover seized the idea of the radio's distribution as a means to make the people who had money loosen up the pursestrings. Henry Ford about this time also carefully worked upon mass psychology with his dictum, "Buy a Ford and Spend the Difference." We are told that the first draft of the advertisement was "Buy a Ford and Save the Difference." No such condition faces us at this time. It is rather a question that will demand caution against overspending. So the conditions for the new year all point to an early resumption of greater activity throughout the country.

Since Michigan plays such an important role in the national life, our railroads have been improving their properties to meet all the demands that will be made upon them. The Pere Marquette, which serves many of the important industrial communities of this state, has done considerable work to meet these conditions when they arise. We have recently increased the potential of our railroad on Lake Michigan 40 per cent by installing two new steamers at a cost of \$1,850,000, for this is a short route between the northwest and the Niagara frontier. We have expended \$2,500,000 in our new Ottawa yards at Erie, Michigan, to relieve the "bottle neck" situation at Toledo. We have made large outlays for similar improvements at the Wyoming yards, Grand Rapids. When the greater activity of 1925 arrives we will be in a position to meet all the demands made upon us.

Business May Be of Record Size

By J. E. Gorman

President, Chicago, Rock Island & Pacific

1 WITH the record of almost phenomenal crops marketed at top prices in the western country, I thoroughly believe that we are set for very healthy and prosperous conditions for the year 1925, especially in Rock Island territory, and that railroad traffic during the new year will be much heavier than it was during—at least the early part—of the year 1924, and there is a possibility—assuming that crop conditions are satisfactory—that business may even reach record proportions.



2. The railroads generally will be in a position to handle currently and with entire satisfaction to the public the increased volume

of traffic because of improved facilities, additional equipment and better operating conditions.

3. It is difficult to state just how large the capital expenditures of the railroads will be during the coming year, but with the improved business prospects and the necessity for continued improvement of railroad properties, I am inclined to believe that the roads will be liberal spenders, both for improved equipment and facilities.

4. The successful stabilization of employment in railway service would have a very marked bearing on morale and would materially aid in developing greater contentment, loyalty and co-operation. Anything that interferes with the continuity of profitable employment is calculated to create mental unrest and certain dissatisfaction and prompts efforts to secure employment where

the prospects of continuous satisfactory earnings are more certain. The best way to secure this stabilization is through the adoption of a program of anticipated expenditures throughout the year which may be followed without regard to financial fluctuations, this particularly having to do with our shop and maintenance forces.

5. The Congress of the United States in the Transportation Act of 1920 provided for the consolidation of railroads, and the Interstate Commerce Commission, after a long study of the subject, suggested the consolidation of these roads into some 19 separate systems. The financial interests of the country seem generally to recognize the desirability of such consolidations, and the thought likewise has a popular public appeal. There is no question but that in a great many instances greater efficiency and some economies in transportation can be secured by consolidations, provided such combinations are effected between lines which naturally form larger economic units, and of course there are many small lines of railroads in various portions of the country whose operation could be made more efficient if consolidated with larger properties of greater financial stability.

6. The one thing needed more than any other to effect a permanent solution of the railroad problem is to take the railroad question out of politics. The operation of the roads is now wisely controlled in every respect by the Interstate Commerce Commission, and it is believed that the recent election results indicate that public sentiment now is that the railroads should be let alone, and if that is the general sentiment of the public, I think it is practically the only thing necessary now to bring about a solution of the railroad problem.

Presidential Election Helps Situation

By J. R. Kenly
President, Atlantic Coast Line

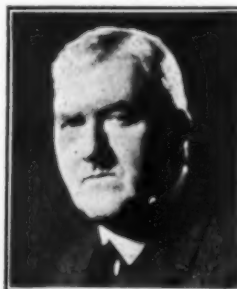
1. YES: due primarily to the result of the presidential election.
2. Yes: due to large expenditures for additions and betterments during the years 1923 and 1924 and to improved management.
3. I think capital expenditures for the year 1925 will not exceed the average for the years 1923 and 1924.
4. Fair treatment of employees and permanency of employment.
5. My mind is not clear on this subject (consolidations); there is so much involved.
6. Legislation that will be fair to the railroads.

Railways Can Be Relied Upon for Full Service

By A. C. Needles
President, Norfolk & Western

THE railroads can be confidently relied upon to furnish full and efficient transportation service during the year 1925. This is based upon:

1. The record in handling business during the past two years.
2. The present good condition of railway properties, following heavy expenditures for equipment and improved facilities during 1923 and 1924.
3. The splendid spirit of co-operation manifested by railway employees, which in a large measure has contributed to the good showing.



A. C. Needles



J. R. Kenly



A. T. Dice

Danger in Tendency to Make Consolidations Too Large

By Carl R. Gray
President, Union Pacific System

1. MY belief is that the gross business of 1925 will closely approximate that of 1923, and be to that extent larger than for the year just closing.



2. There is no question of the ability of the railroads to handle satisfactorily even a larger amount of business than this would be.

3. It is difficult to anticipate capital expenditures, because ordinarily few of the budgets have been definitely decided upon. My judgment would be that the aggregate capital expenditures will be less than for 1924, and that the proportion for equipment will be relatively larger.

5. I believe that consolidation

of railways, if permitted upon logical and not upon forced, arbitrary lines, will be advanced, and the commission is in a position to determine the desirability or undesirability from a public viewpoint. My fear is that there will be a tendency to create units of such magnitude as to be unwieldy and render it difficult for management to have that close personal contact which has been such a factor in the railroad improvement of the last five years.

6. If it could be said that there was one thing most needed to bring about a solution of the railroad problem, I would unhesitatingly name it as stabilization of the legislative attitude. The Interstate Commerce Commission, with its years of experience, its precedents, and defined policies, has such an attitude, but it seems difficult for the legislative mind, having done a good job, to let it alone for a sufficient length of time to draw any logical deductions.

Stabilize Employment by Stabilizing Earnings

By Ralph Budd
President, Great Northern

1. INDICATIONS are that traffic will be somewhat heavier in 1925 than it was in 1924.
2. There seems no reason to doubt ability of railroads to handle satisfactorily a much larger traffic.

3. Capital expenditures in 1925 probably will be more than they were in 1924 and less than they were in 1923.

4. On the northwestern railroads, stabilization of employment in railroad service can be promoted by stabiliz-

ing the earnings of the roads. Railroads in that section have not fared well in the matter of net earnings since the war, due to the fact that the increases in their rates have been only about two-thirds as much as the average of the country and only about one-half as much as those given the eastern roads, while their increases in expenses have been fully as much as the average for the country.

5. The public will benefit from such consolidation of railroads as will simplify operation by eliminating terminal

expenses, interchange expenses, and duplication of facilities, including equipment, and at the same time preserve essential competition.

6. The thing that will do the most to bring about a permanent solution of the railroad problem is a consistently fair and constant policy of legislative and regulatory bodies towards the railroads over a period of time sufficient to restore confidence that the railroads will be permitted to earn a reasonable return.

Existing Situation Inspires Optimism

By W. L. Mapother
President, Louisville & Nashville

THE country's present economic structure is susceptible to changed conditions within so short a space of time that no one can accurately forecast the possibilities that lie very far in the future. Barring



fortuitous occurrences, however, and weighing the outlook largely on the basis of the existing situation, the forthcoming year, in my opinion, may be anticipated with a wholesome degree of optimism.

The railroad managements, through the authorization and expenditure of over two billion dollars during the past two years, have placed the American transportation plant on a plane of efficiency that has enabled

them not only to reach new records of performance with little confusion and compliant, but they seem now in position to meet all reasonable traffic demands with ease. The railroad labor situation on the whole seems composed; and through the activities of the managements and their public relations departments in promoting favorable public sentiment upon the more important questions of transpor-

tation, a high state of confidence has no doubt been established. The natural suspense accompanying the presidential election year has been removed which, coupled with the sane and economical Administration policies, will unquestionably serve to so stimulate industrial activity as to very greatly stabilize business conditions; and we may probably see a duplication of 1923 and 1924 with respect to traffic movement.

The one vulnerable spot directly affecting the railroad forecast lies in the action of certain representatives in Congress in attempting to wreck the progress made by the railroads under the Transportation Act by the enactment of hurtful legislation. Personally, I do not view the prospect with any great alarm, but this to my mind constitutes one of the most important questions confronting the carriers and one which justifies the continuation of public education and influence in every practicable way.

If, through sound thinking and wise action of the lawmakers, the railroads are granted a legislative holiday, during which the managers and their forces can devote themselves to plain, common sense transportation without risks of experimental tinkering, I believe the railway situation for the forthcoming year will be such as to insure satisfaction to the public and owners of railway properties.

Railway Outlook is Very Bright

By Agnew T. Dice
President, Reading Company

1. IT is difficult to name the amount, but the favorable business situation, based upon sound fundamentals, should produce a considerable increase of traffic in 1925. The situation is encouraging and the outlook is very bright.

2. I believe the railways will be fully able to handle satisfactorily all traffic offered.

3. Capital expenditures in 1925 will probably exceed those made in 1924, with an appropriate relationship between enlargements and improvements to fixed properties, with equipment.

4. In my opinion it is not possible to stabilize employment in railway service. When business is at the peak, men must be employed and used to handle it. The strain on way and equipment becomes heavier and must be provided for. When traffic is light, receipts are light and the strain on way and equipment is lessened, reducing the necessity for expenditure for those items. It is easy to talk about doing maintenance work during such times because it can be done to better advantage. Many railroads during periods of light traffic have to conserve their resources and are unable to spend anything except what

is absolutely necessary. I know of no other industry in which labor is stabilized, and why we should expect to stabilize railroad employment is too much of a problem for me to solve.

5. In my opinion the compulsory consolidation of railways is a mistake, and if accomplished will prove a disappointment.

6. Brave indeed is he who attempts to name the one thing most needed to bring about a permanent solution of the railroad problem. When some philosopher will be able to permanently solve all or any of the great problems of life, and name one panacea for the ills of man, then may we hope for the discovery of the one thing needed in the railroad world. Private ownership and operation is perhaps the most vital fundamental for the consideration of owners, managers, and the public. It should be assured beyond the possibility of attack with only such regulation as is necessary to prevent abuses. We have had too much supervision, too much meddling, and too much threatening, and if, as seems likely, the future will bring respite from a superfluity of regulation the railways may be brought into the light of a happy day.

Common Stock With No Par Value May Help Financing

By P. E. Crowley
President, New York Central Lines

[Mr. Crowley's article was received just as we were going to press. It will be noted that the questions to which he replies are somewhat different from those answered by the other executives, doubtless due to the fact that inquiries from other sources than the RAILWAY AGE have been combined in such a way as to cover the more important questions from the several sources.—EDITOR.]

WHAT changes, if any, should be made in the Transportation Act at this time in the interests of the railroads and the public?

Private operation of the railroads under the Transportation Act has achieved splendid results for the country. In fact, one must revert to the service of pre-war times to find anything that approaches a parallel for the efficiency which has been shown by the railroads since the enactment of the Transportation Act. To tinker with the instrument under which these results have been achieved would seem to invite disturbance. It is therefore of the highest importance that

any amendments to the Transportation Act which may be demonstrated to be necessary by experience under normal business conditions should be made only after a fair and judicial consideration of all pertinent economic facts.

Is any substantial revision of freight rates necessary or desirable for either the roads or the public? If so, along what lines should the process of adjustment proceed?

It appears from the records of the Interstate Commerce Commission that the railroads of the country as a whole are not earning a reasonable return as defined in our laws. Therefore, it appears there should be no revision that will decrease income. On the other hand the statements made in behalf of the various interests throughout the country and in behalf of various sections of the country, one as against another, have led to many public utterances by authorities to the effect, in substance, that some rates should be reduced. Railroad rates in the United States, however, are not, as a whole, unreasonable, either as compared with pre-war rates in relation to the general price level or as compared with foreign rates, and yield a return considerably below that which the Interstate Commerce Commission has determined as fair. They do not as a whole hinder the processes of production or distribution. The present problem is one of a better adjustment of relative rates—not a general reduction of all rates. This adjustment should be left to the duly constituted government regulating body where it will receive a full and fair hearing and an adequate economic analysis, and not be made the subject of direct legislative action.

What progress do you expect this year in railroad consolidations? Do you think the problem can and will be worked out without further legislation? Along what lines may consolidations most advantageously proceed?

Progress will undoubtedly be made in building up systems through purchase of stock and leases, but actual consolidations where two companies are amalgamated to form a new company are not to be expected until the Commission makes its final grouping of roads under the provisions of the Transportation Act, or until that Act shall be so

modified as to authorize the Commission to approve consolidations in advance of the final grouping where it is of the opinion that a proposed consolidation is in harmony with the declared purpose of Congress to group the roads of the country into a limited number of well-balanced systems. The ultimate grouping of the roads of the country into systems would probably be facilitated if the Commission was given more leeway in the matter and not required to make a hard and fast grouping of all lines as a condition precedent to allowing any consolidations to be made. There should also be a certain liberty of action in determining the lines upon which consolidations should proceed. In some instances actual consolidations or merger may be the best thing, and in other instances the best and most practicable way may be through leases.

How do you regard the present physical condition of the railroads and their supply of equipment?

The present physical condition of the railroads and their supply of equipment, speaking for the country as a whole, has measured up splendidly to the requirements. It must be remembered, however, that the intensity of the demand upon the railroads is continually increasing. It is therefore most desirable that the railroads should not be crippled in income as this would surely force curtailment of the protection afforded the service.

Approximately how much is your road likely to spend on new equipment, materials and supplies, including rails?

It is expected that the usual normal expenditures, based on volume of business, will prevail during 1925.

Would you favor a change in the state laws which prevent a railroad company from issuing stock below par?

It looks as though conservatively capitalized, well managed and prosperous companies would be able to take care of part at least of their capital requirements by the sale of additional stock. If this can be done it will help the situation very greatly because it will retard the rapid growth of the indebtedness of railroad companies with a consequent lessening of the percentage of capitalization represented by stock.

It might be helpful to empower the Interstate Commerce Commission to authorize the issue and sale of stock at less than par in proper cases, but perhaps the better way to deal with that phase of the matter would be for a company to make its common stock with no par value.

How do you view the outlook for net earnings?

There seems to be a prevailing expectation that the volume of business will gradually gain on the volume of 1924. So far as this transpires without disturbance in the returns yielded by the traffic or in the basic wages paid, net earnings should benefit.

What problem in connection with the transportation system do you regard as most pressing at this time?

The thing most important to the transportation system of this country is the same thing of most importance to the public from the transportation standpoint; namely, the continuation of the Transportation Act intact for the present and the disappearance of threats of legislation. The improvement in railway service has continued because the railroads have had an opportunity to work to that end. An unmolested period of attention to business, including economies as well as improved service, relations with the public and employees, will insure a further development along these lines.



From the Railway Supply Industry

THE preceding pages contain expressions from a number of railway executives as to the amount of traffic which may be expected in 1925, the ability of the railroads to handle increased traffic and the possibilities as to capital expenditures; also views on the stabilization of employment in railway service, the consolidation of railways and the permanent solution of the railway problem.

A number of executives of railway supply companies have been good enough to give us their views about the future prospects and also as to specific problems of railroad operation in which they are more directly interested. These articles, which follow, and the one on the "Railway Expenditures for 1925," complete this section of the paper, which is devoted entirely to the business outlook and railway problems.

Harbingers for 1925 and After

By Alba B. Johnson

President of the Railway Business Association

AS the basis for a prediction that ton-miles of freight for 1925 will show an increase over 1923 of not less than 14 per cent, Samuel O. Dunn cited past precedents of traffic increase in his Railway Business



Association speech on December 11. Mr. Dunn thought it was more likely to exceed 14 per cent. The year of the last traffic slump was 1921, therefore 1923 was the second year, and the next year, 1925, will be the fourth year following it. The latest year for which statistics are available is 1923. In an article in *Barron's* last February I charted the four recorded increases in the fourth year over

the second year following a substantial recession, and noted that while one such increase was less than 4 per cent the others were 15.4 per cent, 19.7 per cent and 19 per cent. I then put the question whether railway managers were warranted in basing preparations for traffic increase upon any expectation smaller than the lowest of these three, 15.4 per cent, which last is somewhat higher than Mr. Dunn's estimate.

It seems always necessary to remind many, if not most, observers how invariably we tend to underestimate future traffic growth. We can hardly believe our eyes, knowing in general how depressed conditions were in certain years of the past, when we see in the record that the new high point in ton-miles was reached in the very midst of prevalent commercial failures and industrial unemployment. The late George F. Baer pointed out to me the serenity with which the freight avalanche moves over obstacles seemingly mountainous: Wars, crop failures and even political folly—conforming to a cycle of recovery from extreme individual skimping into freer buying and consequently widening demands upon the carriers. Nine out of ten men you meet in discussing the 1925 prospects volunteer the remark that a vast tonnage was carried in 1924 without car shortage although a great number of good order locomotives and cars were stored and the good order percentage of all locomotives and cars was smaller than in 1923. It is only necessary to reply that so was there a vast tonnage in the third year after every substantial slump, and yet a fourth year vastly outdid that record. "Large" is a relative term. The stock of locomotives and cars is either equal or unequal to the demands which will be placed upon it and forecasts to be significant will have to be compared not with the work which was done in 1924 but with the work which may be reasonably expected to offer in 1925.

Since February, political anxieties have been for the moment at least assuaged, liabilities in commercial failures have steadily declined, agriculture has recovered, the foreign situation has improved and the sum total of all other portents has brought an almost universal expression of confidence from investors, from industrial and commercial leaders and from economists. Men addicted to caution warn against excessive speed, but even these believe that barring unpredictable catastrophe or incredible stupidity history will repeat itself in the activity of farm, forest, mine and mill. If it does I see no way in which a freight congestion can be averted next fall.

The reason why I have been asked to write this article is that I am an officer of the Railway Business Association. That body is composed of concerns which purvey to the railways rolling stock and parts and the materials for way and structures. If anybody thinks our program is one of narrow self-interest and that it contemplates an effort to frighten the railway managers into unnecessary orders for our products we have but to repeat at this time a saying long established as one of our guiding principles, namely, that waste benefits nobody. Our self-interest—and we cheerfully repudiate any eleemosynary objectives—is an enlightened self-interest. We recognize that the surest and saddest sufferers from calamity if railway facilities should be over-produced would be the members of our association; and that we are likely to fabricate facilities not in proportion to the trouble into which the railroads get but in proportion as they keep out of trouble and are prosperous and contribute to the general prosperity, which produces traffic and creates the necessity for enlargement of the railway plant.

The occasion for forming the Railway Business Association was not so much a desire for a larger volume of railway purchases when the roads came into the market at a time of peak traffic. We were not, as today in some particulars we are not, equipped to handle with satisfaction to our customers or with profit to ourselves the maximum business which might crowd upon us. What the association was organized for was stability; and for this we have prayed without ceasing.

Nor do we view with alarm fuller use of the facilities. We urge it. We provide our members and other shippers at the cost of printing with blanks upon which shipping departments may report to their companies their performance in full loading of cars and prompt loading and unloading. On December 11 we passed a resolution congratulating the shippers on their continued improvement in these respects and on their co-operation through the Regional Advisory Boards for more economical use of cars through systematic distribution. We acclaim

every new high notch in average car loading and average daily car miles.

Mr. Dunn has estimated the new acquisitions in locomotives and cars which would be required next year. He thinks his error, if there is one, is on the side of under-estimate. For two reasons I am inclined to agree with him in this. In the first place, a revision of the figures which I published last February, substituting for estimates the facts now available, suggests that when complete it will indicate substantially larger requirements for locomotives ready for use next September 1 than the 2,500 to 2,700 estimated by Mr. Dunn. In the second place, Mr. Dunn speaks of 2,700 installations "within the next year"; and if we could accept his estimate of needs, the installations to meet the peak must be made by September 1, leaving only seven months for the total if orders placed now were to result in deliveries beginning February 1. Roughly, this is 400 a month. The best information available is that allowing 25 per cent of locomotive building capacity for export, locomotives other than for railroads and separate parts, 400 locomotives of the size and power now being built is substantially above the capacity of the three locomotive building plants. If the placing of orders is delayed, so that deliveries cannot begin by February 1, or if Mr. Dunn's estimate of needs is too small, or locomotive building capacity too large, it would be optimistic to expect an output equal to the requirements. To bend every energy toward provision of rolling stock is vital. It will not be enough. To the seemingly large surplus of rolling stock stored during the 1924 peak all possible additions must be made by reducing bad-order units to or below the percentage reached

in 1923. Improvements in road and structures must proceed as vigorously as weather permits. The roads with the poorest record in yard and line performance must be brought up toward the best. A similar spread of effort for fuller use of cars must proceed among shippers.

Much or most of this will be done. Still we are almost bound to go through at least some autumn weeks when shippers will suffer delay and inconvenience. Economically this may not be an unmixed evil. Some such brake upon undue booming might be regarded as supplementing so analogous and related a device as rising interest rates for money. But politically? Amendments of the Transportation Act will be pressed next winter. Congress meets in December. A freight congestion in October would give an opportunity to radicalism. To keep investors confident and capital for improvement flowing throughout 1925 it will be necessary that all men shall see—so constantly that they cannot ignore it or doubt its presence—an organized militant citizens' force ready for every radical attack and mobilized for the positive project of preserving in the Act the principles essential to a future railway growth sufficient for future national needs. Such a demonstration will sustain on the one hand a belief that amendments if adopted, especially affecting the clauses which deal with the regulation of rates, will be sound; on the other hand create the impression that the Act once having been amended the policy of adequate income will be protected against desultory sharp-shooting through the years to come by the groups identified with shaping it. Signs of such a mobilization appear on every hand, and they are harbingers of good augury for 1925 and for the years ahead.

Prospects for Railway Supply Industry Are Good

By R. P. Lamont

President, American Steel Foundries

FOLLOWING two years of fairly active buying on the part of the railroads, and confronted with the uncertainties of a presidential election, the railway equipment and supply industry faced an uncertain and not very promising outlook for 1924.



The large orders placed in the spring of 1923 were sufficient to keep the industry going at a good rate throughout that year but unfilled orders dwindled rapidly toward the end of the year so that the carryover into 1924 of cars and locomotives was small. However, a fairly good buying movement in February, followed by some additional orders in March and April kept the

industry going throughout the year on about a sixty to sixty-five per cent basis. In the end it developed that more cars were purchased during the year than in 1923, but a good share of the business came just before or immediately following the election—too late to get into the year's production. These latter orders were placed conditional on low selling prices and were taken more with the idea of keeping the organizations going than of making profit.

The total amount spent by railroads for freight and passenger cars and locomotives is estimated at approximately \$450,000,000, considerably less than the actual expenditures for 1923, which amounted to about \$680,000,000. This does not in either case include the large additional amount spent for maintenance and repairs.

The comparative figures of purchases for 1923-1924 and for a twenty-four year average are as follows:

	1923	1924	24-year average
Freight cars purchased	137,000	95,000	144,806
Passenger cars purchased	1,984	1,900	2,388
Locomotives purchased	1,984	1,100	2,884

There is necessarily a lag between the number of cars and locomotives bought in the year and the number turned out.

The actual additions to the equipment of the railroads for the year will be about as follows:

Freight cars	137,000
Passenger cars	3,000
Locomotives	1,800

The bad order cars on October 1 were approximately eight per cent and locomotives seventeen and six-tenths per cent, showing that the railroads maintained during 1924 the high ratio of serviceable equipment of recent years. That the railroads have been amply provided with equipment of all kinds is clearly shown in the car surpluses throughout the year—they have handled a large volume of traffic without congestion, delays or car shortages, and to the general satisfaction of the shipping and traveling public.

As a result of the election, a spirit of confidence prevails throughout the country. Railroads and industry in general can make plans for the future with more confidence than at any time in recent years—certainly since the war. With easy money, better conditions in Europe, a marked improvement in some branches of agriculture, with our people generally employed at good wages, there is every reason for expecting a favorable situation in all

branches of industry. The railroads will have a large volume of traffic to handle and will no doubt be inclined to not only maintain the present favorable situation with respect to their ability to handle the transportation needs

of the country, but also to make some provision for increasing demands which are sure to come if the favorable business conditions should continue for several years—as now seems probable.

Prospect of Increased Electrification of Railroads

By E. M. Herr

President, Westinghouse Electric & Manufacturing Company

THE outlook for railway development is believed to be brighter than has obtained for a number of years. This will result in the promotion of major improvements in many places, which have necessarily been withheld. Among these



will be electrification to relieve congestion, to increase capacity and to make provision for future growth of traffic. The greater flexibility obtained through electric operation and the ability to concentrate a large amount of motive power in a single train make electrification a most effective tool for improved movement of traffic. Fuel and other savings, while important, become

of less significance when consideration of the best tool for traffic movement is involved.

Industrial development has had its greatest success where the best plant and the best tools have been used. To insure a like success for railroad operation in the future a material expansion will be needed and for this reason we look for the early release of extensive programs of electrification as well as improved shops and facilities for maintenance of equipment.

The railroads are alert to the possibilities for improved operation and maintenance that modern electric shop appliances and electric propulsion will provide but it is not as yet clear to many of them how they may attract or

secure the necessary capital to provide these facilities.

Notwithstanding the fact that the railroads have carried the heaviest traffic in history during the past year or two, the net return on valuations has not averaged the 5.75 per cent permitted by Section 15-A of the Transportation Act. We must, therefore, recognize that in general our railroads are performing under a formidable handicap.

The rapid development of electric generating stations of very large capacity and economical performance gives to many railroads facilities for furnishing the electric power necessary for electrification without the necessity for the large capital investment otherwise required.

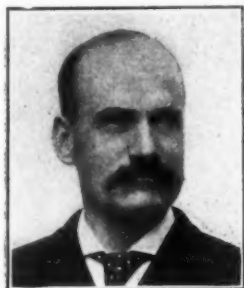
The extensive interconnection of these large power plants also insures to the railroads able to use them not only an adequate supply of power under all conditions but adds greatly to the insurance of continuity of service, so necessary in this important industry in which reliability of the power supply is so vital.

Public opinion is much more favorable toward the railroads than in former years and the improvement in service since the disastrous administration of these facilities by governmental agencies, made necessary by the exigencies of the war, is steadily gaining friends for the railroads and those who are charged with their administration. With the steady improvement in earnings, the time is, therefore, rapidly approaching when the railroads will take advantage of the many favorable conditions and proceed with the many large projects for betterment so long deferred, of which electrification is one of the most important.

Locomotives for Business Purposes

By G. M. Basford

SLOW drag freight trains and double headed passenger trains are costly features of railroad operation. High cost of everything, including wages, high valuation of roadway, rolling equipment and structures and high cost of all kinds of maintenance demands moving freight at higher speeds for less fuel and therefore at lower cost.



Traffic is increasing and becoming too dense for slow movement. We need and we have locomotives today that take the heavy "drag" freight at higher speeds without increasing but actually reducing fuel consumption. They are locomotives of great power and high efficiency. These locomotives start heavier trains, accelerate them quicker and pull them faster. They are properly called *super-power steam locomotives*. To these locomotives the railway operating officer may look for his greatest opportunity

for reducing the cost of transportation.

The day of the big, heavy, wasteful, brute force locomotive has passed. The day for the one that produces maximum power per pound of metal and per pound of fuel is here. Never before has the steam locomotive been the subject and object of efficiency improvements aimed toward higher value from engineering and therefore business points of view as it is today and has been for several years. Many years were required for the preparation. The locomotive has become a highly developed power plant adapted to railroad operation at lower cost. Heretofore it has been merely a puller of trains.

Locomotive starting capacity limits the weight of trains. At speeds above 15 miles per hour the boiler pulls the train and limits the speed. Developments long prepared for and built into practice during the few years just passed have advanced both starting power and sustained power enormously.

One of our greatest railroads faced increasing traffic and increasing importance of the time element in train operation. Obviously locomotives of greater starting

operating officer may look for his greatest opportunity

power and greater sustained capacity for higher speeds were needed. But size and weight limits were inflexible. Two and a half years ago this road put into service a new Mikado locomotive with about one per cent more weight on drivers than its then latest freight engine, which was at that time considered to be up to date. This is what the new engine did.

It provided 39 per cent more starting tractive effort. At 20 miles per hour the new engine gave 28 per cent more drawbar pull. At 30 miles per hour the pull was 47.8 per cent greater and at 40 miles per hour the increased drawbar pull was 78 per cent. These figures are made the more remarkable by the fact that this locomotive used no more coal than its predecessor at corresponding speeds.

In continuous operation over an entire division when burning 6000 pounds of coal per hour the new engine developed 35 per cent more drawbar horse power than the earlier engine. When burning 5000 pounds per hour the increase in drawbar horse power was 25 per cent. This railroad is now reducing its cost of transportation with 300 of these new locomotives.

The figures just mentioned present startling facts. The best thing about them is that in making the facts possible the designers have learned how to go still further and produce even more powerful and more efficient locomotive power plants for both passenger and freight service. There is yet a long distance to go in increasing locomotive power per pound of metal and per pound of fuel consumed. Because of improvements that are now completely available the best locomotives of today will soon be put into the back number class by their immediate successors.

Parallel with the development of the improved locomotive

which is proceeding very rapidly, must come improvements in operation which will permit of securing more nearly continuous action of the improved locomotive power. Perhaps a good way to express what is needed is by referring to the fact that the densest traffic in the world is handled by automatic signals and without train orders of any kind. That is the only way the densest traffic can be handled, it is the only way that traffic approaching congested terminals can be handled. To give the improved locomotive a chance to work there must come a change in blind worship of the train order, beginning with the abolition of the "31" order, followed by the "19" order. Signal indications must take their place. As the locomotive increases in efficiency and in power its value in producing more ton-miles per hour increases, and it is more necessary to safeguard continuity of operation. The locomotive power plant must not be stopped unnecessarily by anything.

As locomotives become more valuable business units locomotive terminals and terminal organizations assume a new importance. They are being brought up to higher efficiency because of their influence upon "ton-miles per hour."

Locomotives are improving more rapidly than ever before in the history of transportation. This is because of the combination of engineering and business considerations with respect to their development.

Relief for the operating officer was the object of all this locomotive improvement effort. The operating officer is the beneficiary. That officer who is not fully informed about what he has now available to pull his trains for less money, that he did not have only a couple of years ago, has a great surprise awaiting him. He needs to wait only long enough to verify these statements.

Increased Recognition of Value of Signaling

By W. W. Salmon

President, General Railway Signal Company

NOT many years ago block signaling and interlocking were quite generally regarded by railway operating officers as being merely "safety" devices and in consequence large signaling installations were rarely made on other than lines having a heavy passenger service.



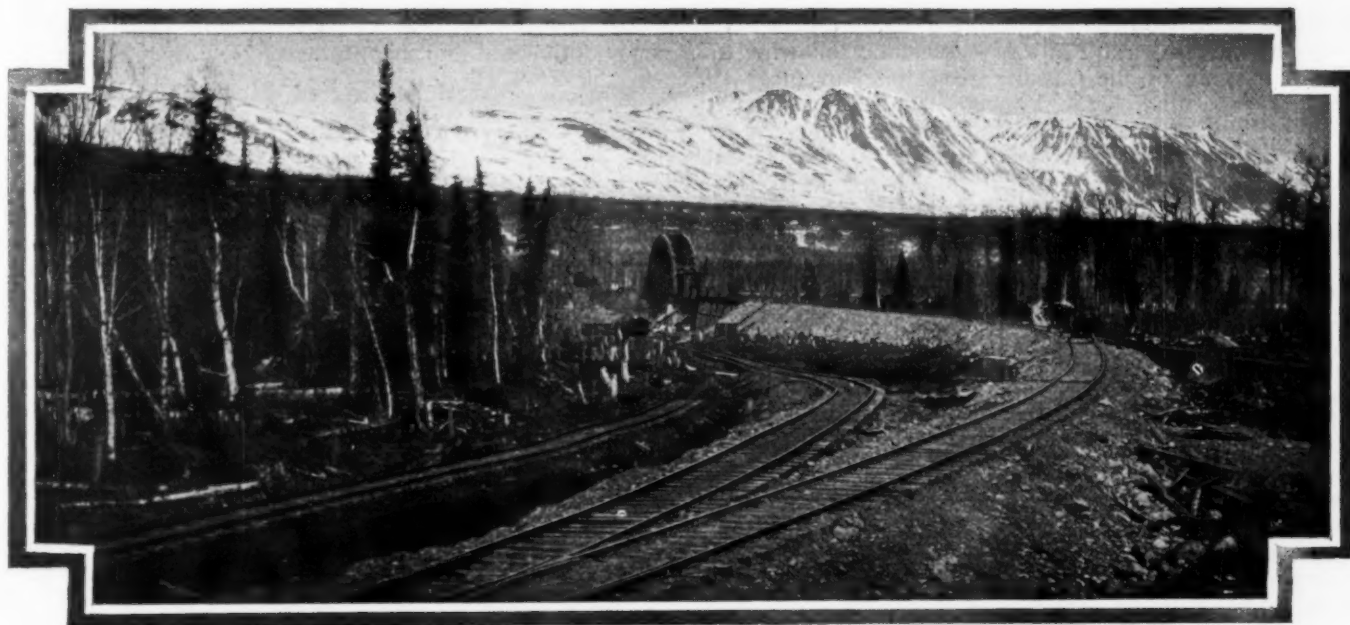
At present, with fuller information as to the actual costs of freight-train delays, modern signaling has come to be considered of prime importance, not only from the "safety" standpoint but far more so, in its economic aspect—with respect to securing increased train miles per hour, savings in engine and train crew overtime, reduction in number of

locomotives and cars required, postponement of construction of additional tracks—all of which advantages are now almost universally recognized as obtainable in large degree through the installation of modern automatic block, interlocking and remote switch-operating devices.

It is doubtless quite as much due to this now widespread recognition of the great economic value of signaling, as it is to the recently improved financial condition and prospects of American railways, that at this time we have on hand a far larger amount of orders for signaling to be installed during the coming year than we have had at the end of any prior year in our history.



A Railway Signal Tower and Interlocking Signals in Czechoslovakia



Railway Expenditures Will Establish New Records in 1925

Survey of Budgets Indicates Large Improvement Program in Prospect for Year Now Opening

By E. T. Howson

THE railways of the United States and Canada will spend more than \$1,350,000,000 for additions and improvements to their properties in 1925, or 15 per cent more than was expended during either of the two preceding years, both of which established high records in this respect. This forecast is made after comparing the amounts reported to us by representative roads as definitely authorized or planned at the beginning of the last two years, with the expenditures actually made during those years and with the appropriations which we have been advised are now made or definitely planned for 1925. This forecast is the more significant by reason of the fact that it indicates the continuance at an increased rate of the liberal program of improvements which has characterized the policy of the railways since they got their properties in hand after their return from federal control.

In establishing this forecast of expenditures for the following year as a feature of its annual statistical issue, the *Railway Age* pursues a policy of erring, if at all, on

the side of conservatism. Thus in the forecast made for the first time for the year 1923 and published in the issue of January 6, 1923, page 15, it was estimated that the roads in the United States and Canada would spend more than \$700,000,000 in the following twelve months. When it is considered that in only one year in the 10 years preceding that date had the records of the Interstate Commerce Commission shown an investment in road and equipment greater than this amount and that the average annual increase during this decade had been less than

\$500,000,000 the magnitude of the expenditures included in that forecast is evident. Yet, the unprecedented volume of traffic handled throughout that year created such pressing demands for facilities and particularly for equipment that capital expenditures made by the roads in the United States alone exceeded our estimate by 50 per cent, aggregating \$1,059,149,426.

Our forecast for the year which has just closed made in the *Railway Age* of January 5, 1924, page 14, indicated that the roads of the United States and Canada

Information received from 32 roads with an aggregate mileage of 126,000 indicates that the railways of the United States and Canada will spend \$1,350,000,000 for additions and improvements to their facilities in 1925, or at a rate 15 per cent greater than during the last two years.

Expenditures for additions and improvements to roadway and structures will receive more attention in 1925 than in either of the two preceding years, although expenditures for equipment will be fully up to normal.

The improvements which will be made during 1925 will be designed particularly to reduce costs of operation.

would spend \$1,200,000,000 during 1924. Figures made public by the American Railway Association following the annual meeting of the member roads on November 19, 1924, showed that \$1,077,297,000 had been authorized by the Class I roads of the United States alone for expenditure during the year and that \$610,904,000 had actually been expended for capital improvements by these roads in the first nine months of the year. With the increased activity which prevailed during the closing months of the year it is evident that our forecast, which included the Class 2 and Class 3 roads and also the Canadian roads, has been closely approximated, if not exceeded.

The information which the roads have themselves furnished us regarding their plans for 1925 indicates that the expenditures which they will make during this year will exceed those made during 1924 by 15 per cent. This forecast is substantiated by an estimate prepared by the Association of Railroad Executives at a meeting in New York and made public on November 19, which indicated that the Class I roads in the United States alone would spend approximately \$1,100,000,000 for new equipment and improvements in facilities in 1925.

In arriving at our estimate of the volume of capital expenditures which will be made during the year which is now opening we have been aided by comparison with a similar survey which we made one year ago. At that time 34 roads with a combined mileage of 109,415 gave us information concerning the work which they had already authorized or definitely planned, aggregating more than \$350,000,000. This year 28 roads with an aggregate mileage of 88,000, or 35 per cent of the total in the United States, have furnished us with data showing that they have already decided on improvements which will require an expenditure in excess of \$365,000,000 while four additional roads with 38,000 miles of line have given us partial estimates of their plans involving the expenditure of \$50,000,000 additional.

Less Work Left Incomplete at End of 1924

While the magnitude of the expenditures in prospect for 1925 thus exceeds those of a year ago the amount of work carried over from the preceding year is somewhat less. A year ago the Bureau of Railway Economics estimated from data collected from the roads that over \$300,000,000 of 1923 appropriations was carried over into 1924. This was due in large measure to the inauguration of numerous large projects, such as the Natron cutoff of the Southern Pacific in Oregon late in the year. While the American Railway Association is authority for the statement that \$466,393,000 remained unexpended on 1924 authorizations on September 30, 1924, the rapidity with which much of this work was prosecuted during the closing months of the year leads to the conclusion that the amount of work carried over into 1925 was less than two-thirds of that carried over into the year which has just closed. The information furnished by the 32 roads referred to indicates that these roads with approximately 50 per cent of the mileage have carried over \$115,000,000. Since these roads include the lines which are now engaged in the prosecution of the larger programs, our figures confirm the estimate made above.

This reduction in the amount of work carried over was induced to some extent by the decline in traffic during the spring and early summer which caused some roads to postpone decisions on projects which would otherwise have received attention and been authorized at that time. This condition was not relieved in full until the outcome of the election was known and the season was then so far advanced that the consideration of many projects was postponed until the budgets could be considered in their entirety. As a result the work which will be done this

year will consist to a larger degree than usual of projects newly authorized and inaugurated.

National Election Exerted Marked Influence

In no industry has the result of the national election in the United States exerted a more marked influence than in the railway industry. On one hand it has created widespread optimism regarding the future business outlook among industries in general with the result that all indications point to an active year in business with correspondingly heavy demands for transportation which may reasonably be expected to pass all previous records. A traffic of this magnitude will not only require additional facilities but will provide the earnings by means of which the improvements may be financed.

An equally important result of the election from the standpoint of the railways is the decisive manner in which the people expressed their attitude concerning the railways, brought so prominently to the fore by the third party. This action has given railway managements a greater sense of security against legislative harassment than has existed since the beginning of the war. As a result they are facing the necessity for large expenditures for more facilities with greater courage than for a decade and are showing an increasing willingness to undertake improvements requiring large expenditures and considerable time for their completion. This attitude is reflected in their budgets.

The Work Carried Over

The amount of work carried over, while less than that of a year ago, as indicated above, includes a considerable number of large projects. Thus, although the Castleton cutoff was formally placed in service a month ago, nearly \$2,500,000 remains to be spent for terminal facilities and other work included in this project, while a total of more than \$10,000,000 was carried over by the New York Central System. The Central of Georgia has made active progress in the reconstruction of its line between Birmingham, Ala., and Columbus, Ga., on which it started last spring, but more than \$3,000,000 remains to be spent on this work during the current year. The Central Railroad of New Jersey has carried over more than \$10,000,000 involving primarily the construction of a bridge across Newark Bay and the elimination of grade crossings at Somerville and Perth Amboy, N. J. The Louisville & Nashville authorized improvements prior to December 1, 1924, involving a total expenditure of \$32,300,000 on which approximately \$20,700,000 was spent prior to that date, leaving \$11,700,000 to be expended after December 1, 1924, and mainly during 1925. The Norfolk & Western carried over unexpended appropriations aggregating \$10,000,000, while the Reading carried over \$2,500,000.

Some of Larger Appropriations Carried Over

Southern Pacific-Pacific System	\$20,570,000
Atchison, Topeka & Santa Fe	20,000,000
Louisville & Nashville	11,700,000
New York Central System	10,939,000
Central Railroad of New Jersey	10,000,000
Norfolk & Western	10,000,000

Among other roads which carried over large amounts of work were the Santa Fe with approximately \$20,000,000, and the Southern Pacific, Pacific System, with \$20,570,000.

Our Figures Are Necessarily Incomplete

Notwithstanding the magnitude of the figures quoted above they cover only a portion of the expenditures which will be made by the roads during the year. These figures will be amplified for several reasons. In the first place, a

considerable number of roads, including such large systems as the New York Central and Louisville & Nashville do not prepare budgets of work for a year in advance but consider each project individually as it comes up at any time in the year. In such cases the information furnished us by these roads and included in our tabulations obviously comprises only that work which has already been approved, to the exclusion of other work which will be authorized and for which expenditures will be made during the year.

Even on those roads which prepare budgets it is customary to authorize expenditures at the beginning of the year only for those projects which the managements feel reasonably certain can be carried to completion without interruption. Other projects are authorized and work undertaken from time to time throughout the year, and the appropriations for these will swell the annual expenditures above those incorporated in the budgets.

Our estimates are necessarily incomplete for the further reason that many roads, such as the Atchison, Topeka & Santa Fe, the Baltimore & Ohio, the Boston & Maine, the Chicago & North Western, the Chicago, Burlington & Quincy, the Delaware, Lackawanna & Western, and the

in the United States. As a result the Canadian roads will, in general, maintain a conservative attitude relative to expenditures until they can ascertain the general trend of business in the spring. This policy is induced to some extent by the fact that the Canadian railways are overbuilt with respect to the demands of the country and that the need for increased facilities is less pressing than in the United States. The two principal Canadian railway systems, the Canadian Pacific and the Canadian National Railways, are also in better physical condition than for some time so that the necessity for unusual expenditures for maintenance is also not pressing.

What the Appropriations Are For

The money which the railways are appropriating will be applied to additions and improvements to all the facilities which comprise a railway. It will provide a considerable mileage of new lines and a larger mileage of second and other multiple main tracks. It will go for the construction of new and the enlargement of existing classification yards, for new passenger and freight stations, for shop buildings and their tool equipment, for signals and train control. A large amount will be used for the purchase



Aeroplane View of the Michigan Central's Niagara Arch

Union Pacific have not yet completed their budgets and will not arrive at their decisions and make the necessary appropriations until some time in January. In view of the belief in many quarters, which has much to substantiate it, that the traffic which the roads will be called upon to handle during 1925 will exceed their present estimates and may possibly remove some of the present confidence of their managements regarding their ability to handle it, it is to be expected that numerous projects not now included in budgets will be undertaken as the immediate necessity develops during the year which will give rise to increases in the total expenditures beyond those indicated by a study of the budgets now prepared.

In contrast with this situation on the railways in the United States, the roads in Canada are facing a less optimistic outlook. Their traffic during 1924 was below that of the previous year, owing to the shortage in the wheat crop, while business in general, which is affected by this crop, has not shown the upward trend that is now evident

of cars and locomotives, while other amounts will be spent for the strengthening and enlargement of present facilities, such as the reconstruction of bridges, the laying of heavier rail, the addition of more ballast, the replacement of obsolete coaling and water stations with modern facilities, etc.

The figures which have been given us by the roads indicate that a larger proportion of the total appropriations will be applied to improvements to roadway and structures than in the recent past. During 1923 the Class I roads of the United States spent \$1,059,149,426 for capital improvements, of which amount \$208,966,280 was for locomotives, \$472,757,711 for cars, and \$377,425,435 for other improvements. During the year which has just closed expenditures were authorized aggregating \$101,233,000 for locomotives, \$412,264,000 for cars and \$563,800,000 for improvements to roadway and structures and extensions. Thus 64 per cent of the expenditures made in 1923 went for equipment as compared with 48 per cent

in 1924. The same trend is noted in the appropriations for 1925, for nearly 70 per cent of the \$415,000,000 for which distribution has been furnished us is intended for roadway improvements as compared with approximately \$136,000,000 for cars and locomotives. This condition was not unexpected, but as a matter of fact it seems reasonable to anticipate, in view of recent experience, that about 40 per cent of the total capital expenditures will be made for equipment, which would make the total spent for equipment relatively large.

Facing the heaviest traffic in their history in 1923 with equipment in a deteriorated condition as a result of the shop-craft's strike, the roads purchased large numbers of new cars and locomotives to give them most quickly the necessary increase in capacity which they foresaw would be necessary. This was reflected in the distribution of expenditures that year. With this equipment they demonstrated their ability to handle all of the traffic offered that year as well as during 1924, with the result that their requirements in this direction are now determined primarily by the necessity of providing for normal retirements and for increases in traffic.

The allocation of increasing proportions of available funds to roadway improvements indicates a growing conviction in the minds of railway managements that the critical point in railway facilities will soon be, if it is not already, the capacity of the roadway facilities, line and terminal, for the amplification of these facilities has been neglected in large measure during the last decade.

A large part of the appropriations for additional facilities is also going for those improvements which have for their immediate objective not an increase in capacity but a reduction in the cost of operation. The facility with which the roads have handled record-breaking traffic at intervals during the last two years has demonstrated what they can do when pressed. Much of this traffic has been handled, however, at a cost so high as to warrant large expenditures for improvements to effect increases in train loads, reductions in delays, or other economies in transportation costs. Facing a period of reasonable assurance of security from adverse legislation the budgets which are being approved indicate that the railways are authorizing the expenditure of increasing amounts for work of this character which has for its effect the lowering of transportation costs. The opportunity for improvements of this character is evidenced by the condition which has prevailed on more than one road in recent years whereby money has been available only for those projects which give promise of yielding a return of at least 25 per cent on the investment.

Roads Which Furnished Information

The roads which furnished information concerning the expenditures which they contemplate making during 1925, from which this analysis has been made, include the following:

Alabama & Vicksburg	Minneapolis, St. Paul &
Carolina, Clinchfield & Ohio	Sault Ste. Marie
Central of Georgia	Missouri, Kansas & Texas
Central Railroad of New Jersey	Missouri Pacific
Chicago Great Western	Nashville, Chattanooga &
Chicago, Indianapolis & Louisville	St. Louis
Chicago, Rock Island & Pacific	New York, New Haven &
Delaware & Hudson	Hartford
Duluth, Missabe & Northern	Norfolk & Western
Florida East Coast	Pennsylvania
Great Northern	Pere Marquette
Illinois Central	Reading
Long Island	St. Louis-San Francisco
Louisville & Nashville	St. Louis Southwestern
	Southern Pacific Lines
	Southern Pacific-Pacific System
	Virginian

In addition the following roads gave us partial information concerning their plans for the ensuing year:

Atchison, Topeka & Santa Fe	New York Central
Atlantic Coast Line	Union Pacific

In general those roads which are now showing the most favorable gross and net earnings are those which have made the most liberal expenditures in the past to increase the amount of traffic they can handle and to reduce the cost of handling it.

Among the roads which are contemplating the most extensive improvement programs are the Southern Pacific-Pacific system, the Illinois Central, the Pennsylvania, the Missouri Pacific, the Louisville & Nashville, the Central Railroad of New Jersey, and the Central of Georgia. The Pennsylvania plans to spend more than \$60,000,000 during the year, of which approximately \$35,000,000 will go for roadway and \$25,000,000 for equipment. While the New York Central does not prepare a budget, it has carried over approximately \$11,000,000 in unfinished work. The Illinois Central plans to spend more than \$42,000,000 during the current year, including \$25,000,000 for roadway and structures and \$17,000,000 for equipment. Among the larger appropriations to the roadway account during the current year are \$8,684,000 for the Chicago terminal improvements and electrification and \$5,000,000 for the work on the new line between Edgewood, Ill., and Fulton, Ky.

Some of the Larger Budgets

Pennsylvania	\$60,000,000
Southern Pacific-Pacific system	52,000,000
Illinois Central	42,188,460
Missouri Pacific	26,212,000
Louisville & Nashville	20,000,000
Chicago, Rock Island & Pacific	17,011,308
Norfolk & Western	16,000,000
Reading	15,222,488

The Southern Pacific-Pacific System expects to spend \$52,000,000 in 1925, \$14,200,000 of which will go for equipment and \$37,800,000 for roadway. The Southern Pacific Lines in Texas and Louisiana also contemplate the expenditure of approximately \$10,600,000 for new facilities, of which \$3,150,000 will go for equipment and \$7,450,000 for roadway facilities.

The Central of Georgia plans to spend approximately \$9,721,000, including \$4,300,000 carried over from 1924, of which more than \$3,000,000 is for the reconstruction of its line between Birmingham and Columbus. The Central Railroad of New Jersey contemplates the expenditure of \$14,500,000, including \$10,000,000 carried over from 1924, of which \$1,000,000 is for new shop facilities, \$800,000 for the renewal of bridges and a similar amount for the construction of coal piers.

The Chicago, Rock Island & Pacific contemplates the expenditure of \$17,011,000, of which amount \$780,000 is set aside for the construction of new lines and \$3,400,000 for second track. The Great Northern also expects to spend \$13,000,000, of which \$7,500,000 is for equipment.

Another road which is continuing its program of making liberal expenditures for additions to its facilities is the Norfolk & Western, which, in addition to carrying over \$10,000,000 of work, plans to spend \$6,000,000 additional during 1925, all but \$200,000 of which will go for roadway. Among the appropriations contemplated by this road are \$2,000,000 for second track, \$1,000,000 for classification yards and \$1,000,000 for signaling. The Reading also contemplates spending \$12,600,000, approximately \$8,700,000 of which will go for equipment and \$3,650,000 for a new grain elevator, the reconstruction of bridges and other work.

Several New Lines Will Be Built

While it has been recognized for several years that the railways of the United States have, in general, passed from the period of extensive development, or the construction of large mileages of new lines, to the period of intensive development of existing facilities, a number of important extensions are now under construction. Among these are the lines which the Southern Pacific has recently undertaken in Arizona, aggregating 172 miles on which it is anticipated that \$7,000,000 will be spent during 1925. The Union Pacific has a 94-mile line under construction between Rogerson, Idaho, and Wells, Nev., which is estimated to cost \$3,600,000, while the Illinois Central has allowed \$5,000,000 for the work which will be done this year on the new line for which it has just awarded contracts between Edgewood, Ill., and Fulton, Ky., a distance of approximately 165 miles. Another important project which is outside the limits of the United States, but which is being built as a subsidiary of an American road, is the 95-mile extension of the Southern Pacific of Mexico between Tepic and La Quemada which involves an expenditure of more than \$11,000,000 and which is now approaching completion. This line is a subsidiary of the Southern Pacific and when completed will give an all-rail connection between the main line of that road at Tucson, Ariz., and Mexico City, through the undeveloped territory along the west coast of Mexico.

More Than \$50,000,000 for Multiple Main Tracks

The construction of second and other multiple main tracks will also receive much consideration during 1925. Information which has been furnished us indicates that more than \$50,000,000 will be spent for this purpose during the year. The largest appropriation for this purpose which has been reported to us is that of the Chicago, Rock Island & Pacific which has appropriated \$3,400,000. Only slightly less in amount are the expenditures of \$3,103,000, which the Florida East Coast expects to make for 61 miles of second track, and \$3,000,000 which the Atlantic

Appropriations for Multiple Main Tracks

Chicago, Rock Island & Pacific	\$3,400,000
Florida East Coast	3,103,000
Atlantic Coast Line	3,000,000
Norfolk & Western	2,000,000

Coast Line contemplates as necessary for the completion of 87 miles and the construction of 41 miles additional of second track. The Norfolk & Western expects to spend \$2,000,000 for the construction of five miles of second track, the Missouri Pacific the same amount and the Minneapolis, St. Paul & Sault Ste. Marie plans to spend \$1,637,000 for 26 miles, while the New York Central will spend more than \$2,500,000 for the completion of multiple main tracks now under construction at various points on the system.

Freight Classification Facilities

Will Receive Attention

A growing realization of the fact that freight classification yards frequently constitute the neck of the transportation bottle is indicated by the fact that 18 roads contemplate the expenditure of approximately \$16,000,000 for improved facilities of this character at more than 40 different points. The increasing interest which is being given this subject is demonstrated by the fact that 15 roads planned to spend only \$6,500,000 for this purpose last year.

Among the larger appropriations for this purpose are: \$4,600,000 which the Illinois Central has appropriated for improvements at three points; \$2,000,000 which the

Florida East Coast has authorized at two points; \$1,900,000 by the Missouri Pacific at various points on its system; \$1,000,000 for improvements at two points on the Norfolk & Western; \$735,000 for improvements at one point on the Duluth, Missabe & Northern; \$500,000 for additional facilities on the New York, New Haven & Hartford and \$350,000 to be expended at three points on the Minneapolis, St. Paul & Sault Ste. Marie. In addition, appropriations aggregating \$1,892,000 for work of this character have been carried over on the New York Central System and work involving the expenditure of more than \$300,000 remains uncompleted on the Union Pacific.

Passenger and Freight Station Expenditures Normal

As far as passenger terminals are concerned it is expected that the expenditures will continue in about the same volume as in preceding years. While the last unit of the St. Paul union station was placed in service during December, considerable work still remains to be done there. The Chicago union station is also approaching completion and will probably be placed in service in the spring. While the construction of the Cleveland union terminal is in its early stages, it is anticipated that the expenditures on this project will approach \$10,000,000 during 1925. Almost equal to this is the amount to be spent on the Chicago terminal project of the Illinois Central during the year, largely in the electrification of the suburban lines. Among other appropriations for passenger stations of a less elaborate character are \$500,000 for a station on the Norfolk & Western; \$325,000 for a station on the St. Louis-San Francisco; \$225,000 for five stations on the Long Island; \$180,000 for a station on the Illinois Central and \$273,000 for stations at five points on the Union Pacific.

While the amount contemplated for expenditure for freight stations is smaller in comparison with that for passenger stations, eight roads report contemplated improvements aggregating more than \$2,850,000 at 21 points. The Illinois Central expects to spend \$375,000 for similar facilities at four points. The Reading has appropriated \$207,000 for a freight station at one point; the Norfolk & Western \$200,000 for a station at one point; the Norfolk & Western \$200,000 for a station at another point and the Rock Island, \$175,000 for a station at one point on its lines, while the Union Pacific is now engaged in the construction of five stations which will represent an aggregate expenditure of \$287,000.

Shops and Shop Equipment Will

Receive Increasing Attention

An interesting reflection of the increasing appreciation of the relation which modern shop facilities bear to the cost of maintaining equipment and to the efficiency of this equipment in service is to be found in the fact that 17 roads contemplate the expenditure of over \$10,000,000 for improvements at more than 60 points. These figures compare with appropriations of \$6,800,000 by 17 roads a year ago. The largest expenditure authorized is that of the Illinois Central, which plans to spend \$4,079,020 at 10 points. The Central Railroad of New Jersey will spend \$1,000,000 for improved facilities at two points, while the New Haven will spend \$900,000 for the same purpose. Other appropriations for mechanical department facilities reported include \$300,000 on the Norfolk & Western and a similar amount on the Minneapolis, St. Paul & Sault Ste. Marie. \$200,000 on the Great Northern and also on the Carolina, Clinchfield & Ohio; \$162,000 on the Central of Georgia and \$125,000 on the Duluth, Missabe & Northern.

In keeping with the increased interest in shop facilities is a similar interest in machine tools and other shop equip-

ment. Nineteen roads contemplate spending \$3,900,000 for improvements of this character, as compared with appropriations for \$2,600,000 by 18 roads last year. Among the larger appropriations for equipment of this character are those of the Illinois Central for \$1,250,000; the Missouri Pacific for \$400,000; the Norfolk & Western for \$300,000; the Central Railroad of New Jersey for \$275,000; the New York, New Haven & Hartford for \$250,000; the Pere Marquette for \$114,000; the St. Louis Southwestern for \$136,000; the Rock Island for \$125,000; the St. Louis-San Francisco for \$107,000 and the Central of Georgia, the Delaware & Hudson and the Nashville, Chattanooga & St. Louis for \$100,000 each.

Signaling and Train Control

Will Require Large Sums

Fourteen roads contemplate the expenditure of more than \$7,250,000 for signalling and train control equipment. The largest appropriation for this purpose is that of the Norfolk & Western for \$1,000,000; while the Illinois Central contemplates an outlay of \$896,000 and the Missouri Pacific \$722,000 for this same purpose. The Great Northern expects to install 280 miles of signaling at a cost of \$700,000; and the New York, New Haven & Hartford 79 miles at a cost of \$450,000. Other appropriations of this character include \$125,000 for automatic train control on the Monon and \$170,000 for signals on the St. Louis-San Francisco. In addition, the Union Pacific has an installation of train control in progress which will involve a total expenditure of \$698,000.

In addition to the work of the character which has been referred to above, large sums will also be spent for a wide variety of miscellaneous improvements. Thus the Great Northern will spend \$1,000,000 for the strengthening and replacement of steel bridges and \$500,000 for a steel ore dock at Allouez, Wis., while the Central of New Jersey will spend \$800,000 for the renewal of bridges and a similar amount for coal piers. The Central of Georgia will increase its capital investment by more than \$1,160,000 in the strengthening of its track and structures and the Illinois Central will spend \$1,800,000 for the strengthening of bridges.

Liberal Expenditures Will Be Made

For Cars and Locomotives

In spite of the tendency, to which reference has already been made, to devote an increasing proportion of the money available for improvements for additional roadway facilities, the budgets indicate that the expenditures for

Some of the Larger Equipment Programs

Pennsylvania	\$25,000,000
Illinois Central	17,265,870
Missouri Pacific	16,898,000
Chicago, Rock Island & Pacific	9,284,920
Reading	8,697,020
Great Northern	7,500,000
Southern Pacific Lines	3,150,000

equipment will be fully up to normal. This is substantiated by the liberal orders for equipment which were placed in the closing months of 1924, the money for practically all of which will be charged to 1925 accounts. Thus, 23 roads alone contemplate the expenditure of more than \$136,000,000 for cars and locomotives during 1925. In contrast with the policy, which has prevailed to a considerable extent during the last two years, of setting aside a considerable portion of the appropriations for equipment for the strengthening and repair of existing rolling stock,

the appropriations which have been reported to us this year are predominantly for new equipment, indicating that the program of extensive reconstruction which was inaugurated a few years ago has now practically been completed. This budget estimate of \$136,000,000 for 23 roads compares with a corresponding figure of \$63,000,000 for 17 roads last year.

Among the larger appropriations for freight equipment are: \$5,000,000 which the Atchison, Topeka & Santa Fe will spend for 2,000 cars; \$1,268,000 which the Central of Georgia has appropriated for 610 cars; \$3,660,000 which the Chicago, Rock Island & Pacific has appropriated for 1,600 cars; \$5,700,000 which has been set aside by the Great Northern for the purchase of 2,720 cars; \$1,100,000 which the Minneapolis, St. Paul & Sault Ste. Marie will spend for 500 cars; \$7,140,000 for the purchase of 3,000 cars by the Reading; \$2,100,000 for the purchase of 1,000 cars by the St. Louis Southwestern; and \$13,890,000 for the purchase of 6,400 freight cars by the Illinois Central.

Passenger Cars

Among the roads which will spend considerable amounts for the purchase of passenger equipment are: the Central of New Jersey which has appropriated \$630,000 for 35 passenger cars; the Reading, \$1,557,000 for 80 passenger cars; the Illinois Central which will spend \$1,680,000 for 66 passenger cars; and the Long Island which plans to buy 40 passenger cars at a cost of \$1,200,000.

Among the other railroads which have made appropriations for passenger equipment are the Central of Georgia, \$170,000 for six cars; the Chicago, Rock Island & Pacific \$177,000 for six cars; the Florida East Coast, \$410,000 for 13 cars; the Great Northern, \$350,000 for 12 cars; the Minneapolis, St. Paul & Sault Ste. Marie, \$475,000 for 25 cars and the Norfolk & Western, \$200,000 for 10 cars. In addition the New York, New Haven & Hartford will spend \$750,000 for gasoline propelled motor cars and electric locomotives.

The Illinois Central has set aside \$1,691,375 for the purchase of 25 locomotives and the Florida East Coast \$1,002,000 for 18 locomotives. Other large appropriations for this purpose include those of the Central Railroad of New Jersey for \$600,000 for 10 locomotives, the Central of Georgia for \$500,000 for 10 locomotives, the Chicago, Rock Island & Pacific for \$450,000 for the same number and the Great Northern for \$270,000 for 3 locomotives. In addition the Pennsylvania system has set aside \$25,000,000 for cars and locomotives the Missouri Pacific \$12,600,000 for the purchase of new equipment and \$3,900,000 for the repair of equipment now owned. The Southern Pacific, Texas and Louisiana lines will also spend \$3,150,000 for new equipment.

Summary

In studying the above data it should be borne in mind that they are not intended to present a complete review of the improvements contemplated by the railways of the United States and Canada during the year which is now opening, or even to indicate with any degree of completeness the work which will be done by those roads which have given us information concerning their plans. However, they are indicative of the improvements which the roads have already inaugurated or have immediately in mind and will be supplemented by many additions which will be made to meet new conditions as they arise throughout the year. With a prospect of relief from hostile legislation, indications point to the most favorable year which the roads have yet enjoyed and the budgets which have been given above indicate that the money which have been pend for improvement of their properties during 1925 will exceed that of any previous year.

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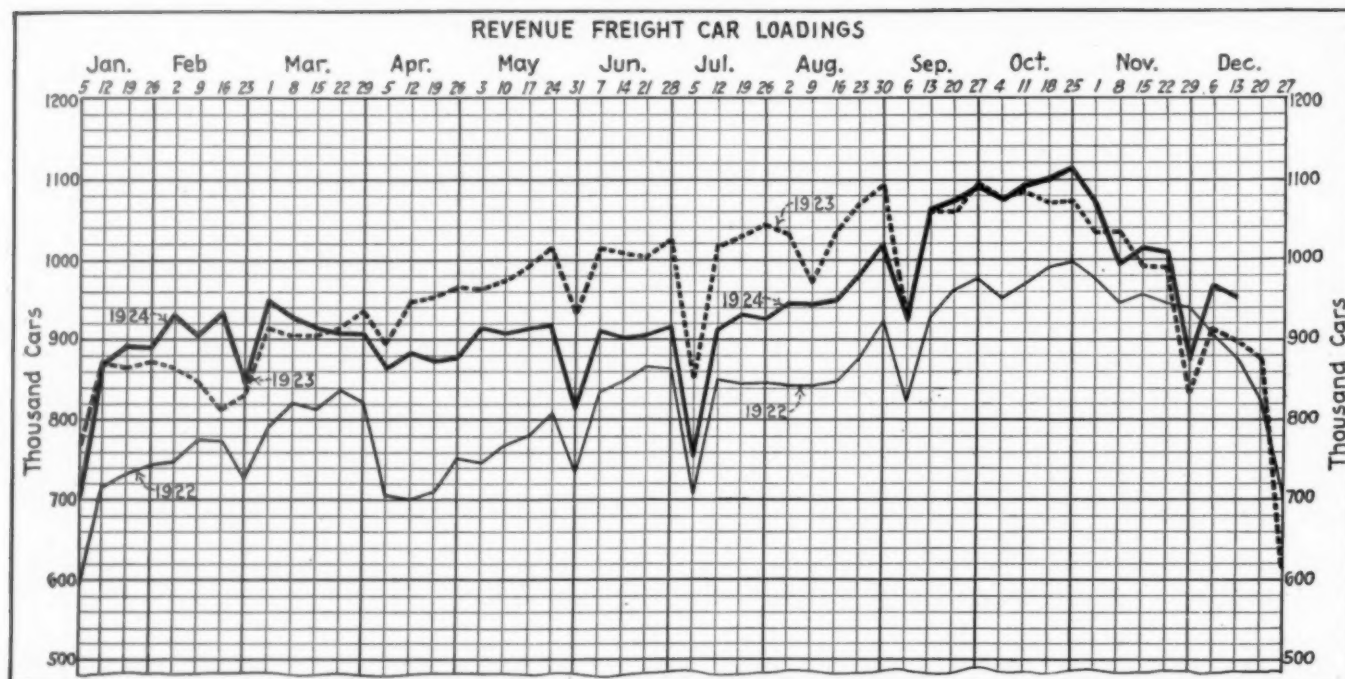
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New Transportation Records

Light traffic during spring and summer followed by unprecedented volume in fall

By H. F. Lane

IN spite of the fact that railroad freight traffic in 1924 has been somewhat less than that of the record-breaking year 1923, which the Interstate Commerce Commission was able to describe in its annual report for that year as "one of hitherto unequalled transportation performance," it is still possible to use a similar title for this article to the one that was used for the transportation article published last year. Not only was the quality of service furnished in 1923 more than maintained but during the latter part of the year several new records were established.

As will be noted from the accompanying chart the line showing the weekly car loading figures through the year has varied considerably from the usual curve. Following the heavy traffic of the late fall of 1923 there was the usual end-of-the-year sharp drop from Thanksgiving week until after New Year's day, after which there ensued several weeks when all previous records for January and

February were surpassed. In the week ended March 1 the total car loading amounted to 945,049 cars, but at about the time when in normal years the curve begins to show a marked upward tendency, it then began to slump gradually and for the last week of June amounted to only 908,355 cars. After the Fourth of July holiday, however, the line begins to follow the usual trend, although for several weeks the loading was approximately 100,000 cars less than that during the corresponding weeks of 1923. In the week of September 12, when 1,061,424 cars were loaded, the 1923 figures were overtaken. The first million-car week of 1924 was that ended August 30, whereas in 1923 more than a million cars were loaded in a week by May 24, and the million mark had been exceeded in 11 weeks up to the end of August.

Up to March 29, 1924, the year's loading was still in excess of that for the corresponding period of 1923; then the cumulative

Greatest number of cars loaded during any one week in history, 1,112,345 cars, week of October 25.

New high record for net ton-miles of freight for a month, October, 43,109,743,000.

New high record for grain and grain products for any one week, 72,474 cars, week of October 25.

New high record in the loading of merchandise and L. C. L. freight, 259,617 cars, week of October 11.

New high record in loading of miscellaneous freight, 422,890 cars, week of October 25.

New high record in movement of both loaded and empty freight cars, 1,030,211 moved in one day, Wednesday, October 15.

New high record for number of surplus cars and locomotives, when loading was in excess of million a week.

No car shortage or congestion due to railroad disability.

New high record in total loading of all commodities except coal, coke and ore, for period January 1 to October 25.

figures for the year to date fell to approximately 1,600,000 cars less than those for 1923, but up to December 6 the cumulative total for 1924 was only 1,395,000 cars below that for last year. Since the week of October 4 the 1924 loading has in each week, except that which included election day, exceeded that for the corresponding week of the preceding year, and whereas the 1923 peak of 1,097,493 cars was reached as early as the week of September 27 the peak loading of 1924, which exceeded that of 1923 by 14,852 cars, was not reached until the week of October 25.

The low loading figures during the summer months, which have kept the 1924 record as a whole from exceeding that of 1923, were due to the fact that coal production was at a very low rate until September, while the coke and ore loading was also very light. Forest products loading has also been below that of the year before, while grain and grain products and l.c.l. merchandise have exceeded the 1923 figures and miscellaneous freight has recently surpassed previous records.

The total loading by commodities for 50 weeks of 1924 as compared with the same period of 1923 and the high years of 1923 and 1920 is as follows:

	50 Weeks, 1924	50 Weeks 1923	Year, 1923	Year, 1920
Grain and grain products..	2,494,885	2,196,313	2,278,878	1,843,018
Livestock	1,692,726	1,708,568	1,797,888	1,553,424
Coal	8,205,508	9,189,856	9,505,432	10,082,450
Coke	494,268	695,688	718,154	647,704
Forest products.....	3,542,816	3,641,343	3,745,485	3,057,730
Ore	1,661,799	2,322,738	2,345,991	2,410,229
Merchandise, l. c. l.....	12,079,916	11,747,780	12,155,271	9,012,511
Miscellaneous	16,799,353	16,822,155	17,267,781	16,511,406
Total.....	46,980,571	48,319,067	49,814,970	45,118,472

Total car loading for the year therefore has been only about 2.7 per cent less than that for the corresponding period of 1923, although the lighter loading per car and the decline in movement of heavy loading commodities will show a greater percentage of reduction in ton-mileage. For the ten months including October the net ton-miles totaled 356,389,671,000, a decrease of 7.7 per cent as compared with the corresponding period of 1923.

Car Miles Per Day and Tons Per Car

The average mileage per car per day has ranged from 25 in January to 30.7 in October (the latest available figures), and was not as high as in 1923. This does not mean that cars were moved any more slowly in 1924 than in 1923, but the decrease is due to the larger number of surplus cars in 1924, as all cars, including surplus and those awaiting repairs, are set up against the total mileage in arriving at the average per day. Subtracting the surplus and bad order cars would show a higher average car mileage than in any previous year. The record of tons per car is disappointing in that it does not equal the figures for either 1920 or 1923. It has averaged about 27 tons as compared with 27.9 for last year and 29.3 for 1920. The decrease is attributable both to the lesser volume of heavy loading coal and ore and also to the lack of the impelling force of a car shortage or fear of a car shortage.

Light Coal Movement

In 1923 the coal tonnage offered the carriers was more evenly distributed throughout the year than ever before, the difference between May and October being only about 8 per cent. The year 1924 started out with relatively large inventories at points of consumption and buyers promptly equalized their stocks with current demand. The condition of easiness during the spring was then followed by a long period of light coal loading due to the fact that heavy stocks had been accumulated at the time there was still fear of a miners' strike.

While coal loading was much lighter in 1924 than

usual some new problems were created by the relocation of much of the movement due to the fact that in a period of low prices the non-union mines were able to take markets away from the union mines. There was also a considerable decrease in the dumpings at Lake Erie ports for the Northwest; but as there was a heavy carry-over at the head of the lakes at the beginning of the season it is believed that an ample supply has now been provided at upper lake ports to meet all requirements. The movement of coal to New England shows a decided decrease compared with that of last year and the failure to accumulate coal in that territory in greater volume will undoubtedly mean a heavy movement during the winter.

A Car Surplus Throughout the Year

Although freight traffic has recently been of record-breaking proportions there has at all times been a more than adequate surplus of cars. At the beginning of the year the surplus was above 300,000 cars but under the heavy traffic that followed it was reduced by February 23 to 125,117 cars. The surplus then began to increase rapidly and by June 15 amounted to 362,961 cars, including about 170,000 coal cars and 150,000 box cars. On April 30 there were over 190,000 surplus coal cars. In July the surplus began to dwindle rapidly but at the time of the peak loading in October it amounted to 94,153 cars, including nearly 30,000 box cars; since then it has been gradually increasing.

Special Movements of Cars in Volume Not Required

No general orders by the Car Service Division requiring movement of cars in volume from one section of the country to another were necessary in 1924. All that has been necessary to keep Western cars returning promptly to owners in sufficient volume either loaded or empty has been to keep before the Eastern and Southern lines the necessities of the West and to call their attention to any loading of Western cars that would not take the cars to their owners' rails. Any deviation from the rules, particularly as to Western lines, has been promptly corrected.

There has been an ample supply of refrigerator cars to meet all demands. The heaviest demand of the fall months was in California where the crop was moved without car shortage. Production of fruits and vegetables in Washington, Oregon and Idaho in 1924 was less than in 1923, which made it less difficult to meet the requirements of California producers. To the refrigerator car supply owned by California lines was added a considerable number of miscellaneous railroad owned cars, and also cars owned by other railroad controlled private car lines not required in the districts where they were owned. These cars were moved to California some time in advance of the movement in order to prevent any possibility of a shortage.

From the standpoint of box car traffic the year 1924 has also been very satisfactory. The records indicate that there has been a heavier loading of commodities in box cars during the year than in any similar period of record.

There has been an equitable distribution of box cars between all sections of the country for the entire year and a very favorable situation as to cars on lines of their owners and percentage of cars on line to ownership, particularly in the Southwestern, Central Western and Northwestern districts. Automatic and current movement of empty Western box cars from Eastern and Southern territory to the Western owners throughout the entire season, without any special orders of the Car Service Division, has been very satisfactory. There was an average movement of 796 empty cars per day of Western ownership through the gateways of St. Louis and Chicago alone

during the months of May, June, July and August. This record is regarded as proving conclusively that to properly take care of an agricultural movement in the West in the fall, a movement of empty cars similar in volume must take place every year, regardless of whether there is a surplus of equipment at the time this movement takes place or not. In other words, the movement of box cars to the Western territory must be continuous throughout the year, and without any deviation, regardless of car surplus or car shortage.

The supply of equipment in the west has been added to by the Eastern railroads voluntarily turning their cars over to Western lines on orders from Western lines for return loading, but the carrying out of the Car Service Rules in the West is resulting in these cars bringing the loaded traffic back by the owning lines more than heretofore.

The very large agricultural production of the West has been handled without complaint or car shortage, except a temporary shortage of small movement which existed for a few days on one of the small Southwestern lines. Investigation, however, developed this to be due more to a lack of foresight in anticipating requirements far enough in advance in order to obtain a supply of cars from their connections, rather than to any actual shortage of cars in the territory.

Grain Loading Records Broken

All previous grain loading records were broken on practically all western lines as was also the record for the receipts at terminal markets. Active co-operation of grain committees of the regional advisory boards with the railroads resulted in handling this large movement without necessity for embargoes to prevent congestion, except at Duluth, where unprecedented receipts of grain exceeded capacity of that market to dispose of daily, in volume received, making necessary temporary embargoes. Grain handled through the Buffalo elevators all during the season to the end of October exceeded all previous records. Throughout the entire season there has been a surplus of grain cars on hand at Buffalo and no shortage at any time.

There has been a continuous surplus of open top equipment throughout the entire year on all lines until quite recently, when there was a very active demand for coal car equipment on the Chesapeake & Ohio, Norfolk & West-

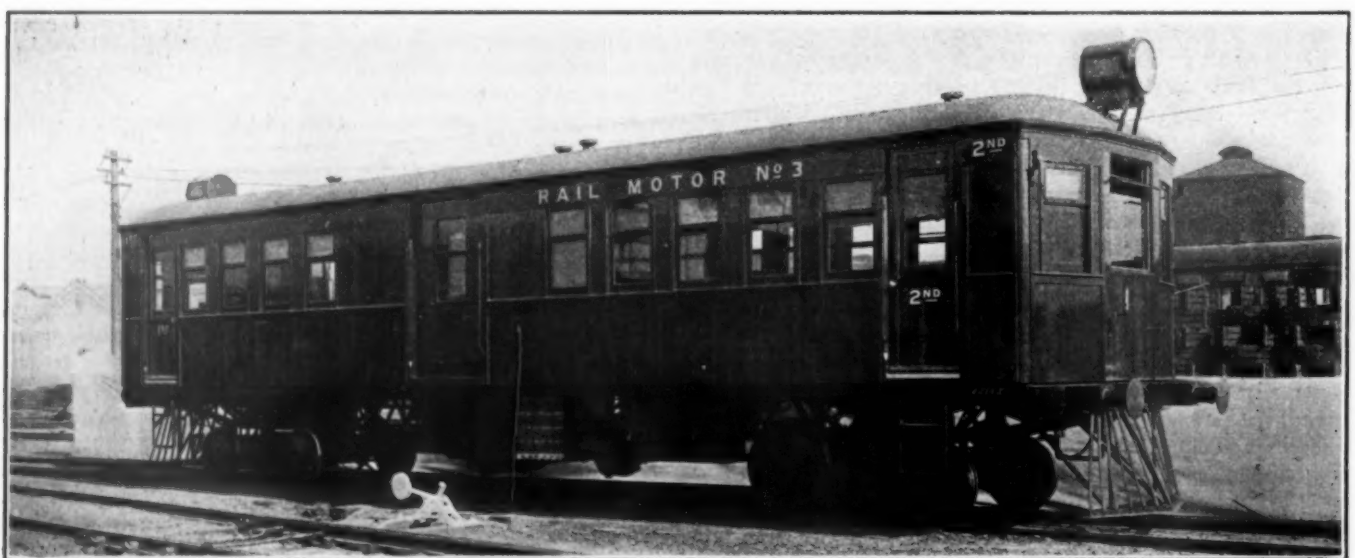
ern and Louisville & Nashville and some shortage of flat bottom cars required for domestic coal moving to Western territories. The Car Service Division found it desirable to issue an order on September 23 requiring that the cars owned by the C. & O., L. & N. and N. & W. be returned to these lines empty, instead of loading any of them in the direction of the mines. This same order was in effect in 1923 and proved very satisfactory and not unduly burdensome to any of the lines handling the equipment.

The sugar beet movement in Michigan is estimated to be thirty-five per cent greater than handled in the previous year. Through the co-operation established between the industry, the individual railroads and the district manager of the Car Service Division, there was less delay to the cars engaged in this service than during any previous period and there has been no shortage of cars for the moving of that crop.

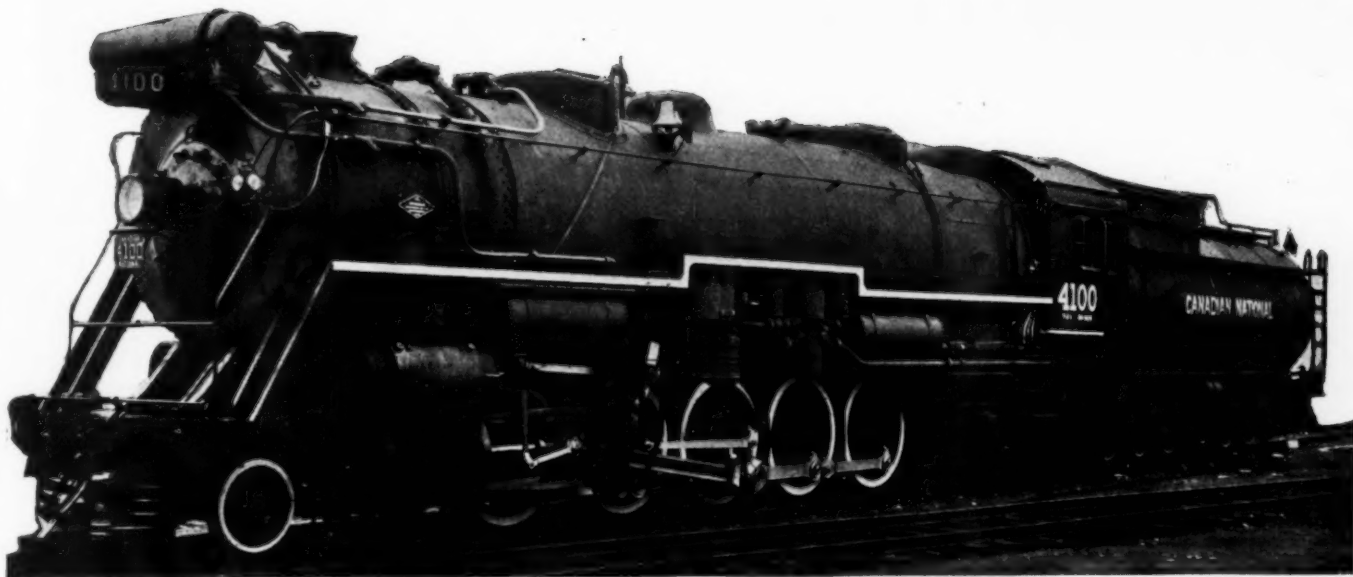
There has been a considerable increase in the demand for open top cars for the loading of sand and gravel in the Southwestern territory. It was thought that this might result in some shortage of that class of equipment for handling the sugar cane crop, but up to this time there has been an adequate supply of cars to meet all requirements. There is some reduction in the production of sugar cane as compared with last year.

Through the medium of the regional shippers' advisory boards, there has been very active co-operation on the part of shippers in loading cars to, via, or in the direction of, the owning line. Their assistance in this direction is said to be responsible in no small degree for the very high percentage of cars on lines of owners in the West that made the transportation of agricultural products so satisfactory. Shippers have rapidly come to learn that with the firm establishment of the principle of loading cars to or via the owners' rails they need have no anxiety as to the adequacy of equipment in the future.

Much of the credit for the improvement in service during the past two years is given by railroad men to the co-operative efforts that have been made possible by the organization of the regional shippers' advisory boards, which have not only enabled a better understanding of local and general transportation requirements, but have afforded a medium which has given the railroads a better opportunity to analyze transportation needs in each territory and to anticipate car requirements.



Gasoline Rail Motor Car, N. S. W. Railways



Canadian Railways Hold Their Own

Low rates and light traffic disappoint optimistic outlook of early months of the year

By James G. Lyne

THE year 1924 began auspiciously in Canada and hopes ran high that the end of the year would find the country well on the way to a solution of its railway problem. Unfortunately, however, the latter part of the year did not bring the traffic which had been

operating revenues of \$32,516,891 for the nine months, an increase of \$2,341,293 over the same period of 1923. The two principal railways, the Canadian Pacific and the Canadian National, contributed almost equally to this increase in net.

The most important problem which any railway can have is that of making both ends meet. Since the Canadian Pacific does this easily and the Canadian National decidedly does not do so, it is the latter system rather than the former which has aroused the concern of the Canadian public. This is all the more true because of the fact that, being a public-owned property, its deficits have to be met from the public treasury. When will the C. N. R. be able to pay its own way?—this then is the most important phase of the Canadian railway problem as it appears to the people of Canada. Indeed it is a problem in which the privately-owned and competing property, the Canadian Pacific is, as one of the largest tax-payers in the Dominion, also vitally interested.

C. N. R.'s Hopes for Big Increase in Net Blasted

In 1921 the Canadian National (including lines and subsidiaries in the United States) was operated at deficit. In 1922 it had a net before fixed charges of \$1,499,782. In 1923 this net increased to \$13,364,875. Fixed charges in the same year, however, exceeded this net by \$52,779,350. Early in 1924, Sir Henry Thornton, president and chairman of the company, predicted that with ordinary good fortune the net for 1924 would increase to \$30,000,000. Unhappily, however, this good fortune did not materialize and Sir Henry, in a statement issued a month or two ago, was forced to revise this prediction to the effect that 1924 net would be equal to that earned in 1923. As is generally known, the primary reason for the failure



One of Several Houses Built for C. N. R. Employees in Jasper National Park

expected—due largely to the partial failure of the wheat crop—and the hopes for marked improvement met with disappointment. Operating revenues for the first nine months of the year were \$319,197,886 as against \$327,004,491 for the same period in 1923. The railways were, however, able to increase their efficiency to such an extent that operating expenses were reduced from \$296,828,892 to \$286,680,995 for the same period, allowing net

of the C. N. R. to pay its way is the fact that it is much over-built when compared with the traffic needs of the country. It is generally realized that the property can never come fully into its own until its facilities can be utilized by paying traffic to a much larger percentage of their capacity than is now the case.

The Crow's Nest Rate Case

About 26 years ago the Canadian Pacific built through Crow's Nest Pass in the Canadian Rockies and received a government subsidy for so doing. In receiving this subsidy the road agreed upon certain low maximum rates in the Prairie provinces. Shortly after the war the Dominion government suspended these rates temporarily but during the past year gradually reapplied them until in July of this year they were allowed to return to full effect. These rates were ruinously low. They applied only on the Canadian Pacific, but of course the Canadian National was forced to meet them at competitive points. Moreover, the Canadian Pacific held that the agreement



Stony Creek Bridge, C. P. R.

did not apply to points not on its lines at the time the agreement was signed.

The result was naturally the grossest kind of discrimination against certain points and equally gross favoritism to others. This situation could not last. Communities discriminated against called upon the Dominion Board of Railway Commissioners to remove the discrimination. Removing discrimination meant the withdrawal of the Crow's Nest rates or the scaling down of all rates to their ruinous levels. The board held hearings on the case and handed down its decision in October, and the Crow's Nest rates were abolished, except on agricultural products.

The case has not rested here, however. The localities favored under the agreement have appealed to the government and will doubtless take the case to the Supreme Court of Canada. Meantime, other sections of the Dominion are asking for rate reductions. The coal interests in Alberta and the Maritimes want lower rates so that they can compete in the Ontario and Quebec markets with fuel from the United States. British Columbia wants rates from the Prairie provinces on the same mileage basis as prevails to the head of the lakes, in spite of the costly

construction of lines necessary for the westward shipment when compared with the eastward.

Rates in Canada Are Low

In 1923 the average revenue per ton-mile of freight handled in the United States was 1.116 cents; on the Canadian Pacific it was 0.929 cents; and on the Canadian National, 1.033 cents. In spite of the fact, therefore, that the rates in Canada were already very low and that one of the systems was, partly because of these low rates, costing the people of Canada millions in taxes, there has been much more agitation for still lower rates. North of the international boundary than there has been South of it. A far from unimportant part of the population of Canada apparently prefers to have a large part of its freight bill paid, not by the purchasers of the service, but by the Canadian people as a whole in the form of taxation. In the words of Sir Henry Thornton:

"The Canadian National Railway System is the property of the people of Canada, and it is for the people, through their duly elected parliamentary representatives and the Board of Railway Commissioners, to determine what the freight and passenger rate policy of the Dominion in its relation to the Canadian National Railway System shall be; but there is no way by which freight and passenger rates can be continually reduced and net earnings at the same time increased; and, moreover, restricted net earnings must inevitably mean additional taxes to provide for annual deficits."

C. N. R. Branch Lines

Prior to the consolidation of the Canadian National Railways under one management a number of branch lines had been planned and grading had been completed on some of them. On the strength of the early completion of some of the lines settlers had taken up land adjacent to some of the routes. The government, therefore, decided to appropriate the money and allow these lines to be carried to completion. This was in 1923. A bill to this effect was therefore drawn up and duly presented in the House of Commons where, after lengthy debate, it was approved. In the Senate, however, it met a different fate. There was an argument against the bill to the effect that the chief trouble with the C. N. R. was the fact that it was overbuilt. Why then add to it? The bill was defeated in the Senate—or to use parliamentary terminology, "given the six months' hoist." When parliament met in 1924, the government decided to propose the branch line program again, but instead of grouping the whole program into one bill, as had been done the year before, a separate bill was made for each project. With this procedure, the Senate was able to consider each project on its merits and as a consequence the larger part of the program was approved—too late, however, for the greater part of the work to be started this year.

The Maritimes Dissatisfied

The railroad problem of Canada has always been very closely associated with the very existence of the federalized Dominion itself. The government's first venture into government ownership was forced upon it by a clause in the agreement under which the Maritime provinces agreed to enter the federation. Now the Maritimes are in arms again. The Grand Trunk, which is now incorporated into the Canadian National, has extensive port facilities at Portland, Maine, which it naturally cannot afford to abandon. The Maritime provinces, however, have ports of their own, St. John and Halifax. Why should they, they ask, be called upon to contribute to the support of a government railway which gives business to a rival port in a foreign country?

The fact that the management of the railway has pledged itself to operate as a commercial enterprise and is therefore presumably utilizing the most economical port, regardless of other considerations, in order that its burden on the taxpayers may be lightened, does not enter into this point of view very largely.

The problem involved here is fundamental, and its final solution may have a considerable bearing on the future railroad policy of the Dominion. Government-owned rail-



Radio Receiving Equipment Is Standard on All C. N. R. Limited Trains

ways throughout the world have as a rule been operated as adjuncts to industry in furtherance of the government's economic policy in much the same manner as a protective tariff, and only secondarily as commercial enterprises run for the purpose of producing revenue. Canada proposed to depart from this policy and to allow the management of its government railways a free hand in operating the properties on recognized commercial lines. Any change in operations, based not upon carefully studied economic grounds but forced through the political activity of the Maritime provinces, would in a sense, denote a rather important departure from the policy of non-interference laid down by the government when the new management was placed in charge.

Labor Relations

From a standpoint of labor relations the past year has been very quiet in Canada, as it has in the United States, no serious problems having arisen for solution and the horizon is so far unclouded for next year. During the

first few months of the year the management of the Canadian National and the Railway Employees' Department of the American Federation of Labor reached an agreement calling for a study by the latter of the feasibility of applying in the C. N. R. shops the so-called "B. & O. Plan" of management-employee co-operation. After an exhaustive study by the consulting engineer for the employees, it was decided to give the plan a trial on the C. N. R. It will accordingly be put into operation at the company's Moncton, N. B., shops and, if successful, will probably be extended to other shops on the system.

Traffic and Revenue Compared

Up to the week ended November 22 car loadings in Canada had totaled 2,640,108. For the same period in 1923 the loadings were 2,569,440. The decline in loadings was mainly in grain and grain products, lumber and pulpwood.

Additions and Betterments

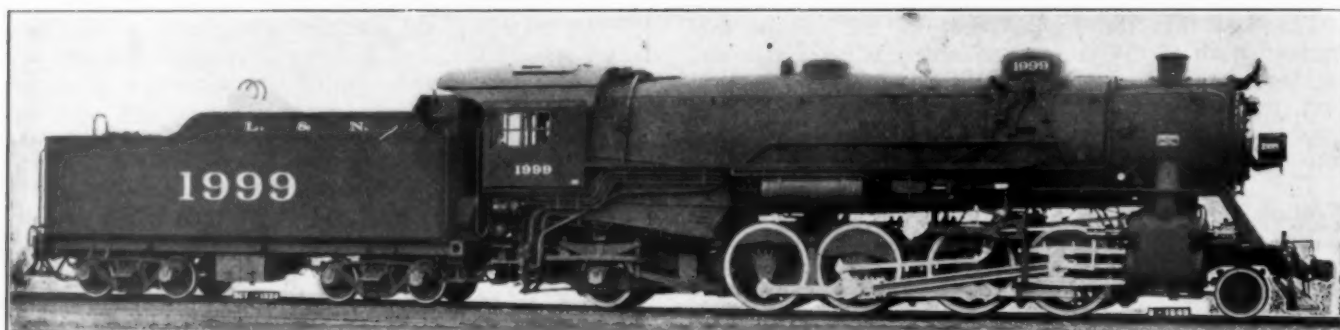
No construction projects of great size were undertaken or completed during the year, but formal agreement was reached on improvements in Toronto to cost approximately \$30,000,000 and work will be started during 1925. The principal part of this project is the construction of a railway viaduct for both the Canadian Pacific and the Canadian National throughout the length of the Toronto water front. This viaduct will eliminate grade crossings and make the water front easier of access to highway vehicles. At the same time it will bring into use the new Toronto union station which was completed several years ago but which has not as yet been used.

The Canadian National during the year placed orders for 56 locomotives and the Canadian Pacific for 15. The latter road ordered 100 refrigerator cars and the former 2,161 of various kinds for freight and work service. Data on additions and betterments are given in detail in the statistical section elsewhere in this issue.

The Canadian Pacific built during the year some 405 miles of new first track. Other work of importance consisted of a large station and office building at Three Rivers, P. Q., stations at 14 other points, several new enginehouses and extensions, new coaling stations, etc. The Canadian National built several new stores buildings at its Point St. Charles shops, renewed a number of bridges and trestles, improved its wharves at Portland, Me., revised grade and lines at a number of places, provided improved locomotive and yard facilities and commenced the separation of grades at Detroit. The company built some 117 miles of first main track during the year and has about 157 additional miles under construction. Double-tracking totaled about 25 miles.



Ssuningkai, Junction of the Ssu-Tao and South Manchuria Lines



Three-Cylinder Mikado Built by the American Locomotive Company for Louisville & Nashville—Tractive Force, 65,700 lb.; Weight on Drivers, 245,500 lb.

Tendencies in Equipment Design

Departures from beaten path growing in the locomotive field—New transmissions for motor cars

THE year 1924 has witnessed the successful development of certain types of railway equipment which, heretofore, may be said to have been in a more or less experimental stage. A willingness has been exhibited on the part of motive power and equipment designers in practically all fields to admit of the ultimate possibilities of types which, until now, have been looked on as so radical a departure from conventional standards that any intensive effort toward practical adaption to railway use could hardly lead to productive results. This spirit, in itself, is a sign of progress.

Particularly is this true in the field of motive power. During a century of development of railway locomotives so many ideas have momentarily attracted attention and then passed into history because of impracticability that the engineer has acquired a spirit of conservatism which precludes the acceptance of a new and radical type until its development has reached that stage where it is possible to measure its utility by commonly accepted standards of performance. The past year, it is true, has not brought forth anything markedly different in locomotive design, but several such developments of previous years may now be safely said to have reached a stage where it is now practicable to determine their service utility with a fair degree of accuracy.

Three-Cylinder Locomotive

Without doubt, the three-cylinder simple locomotive is the outstanding development and, while its reintroduction to the American motive power field was an event of 1923

rather than 1924, its performance during this past year seems to have assured its acceptance. The fact that at least eight railroads in the United States have placed orders for a total of more than 40 of this type would appear to confirm this statement.

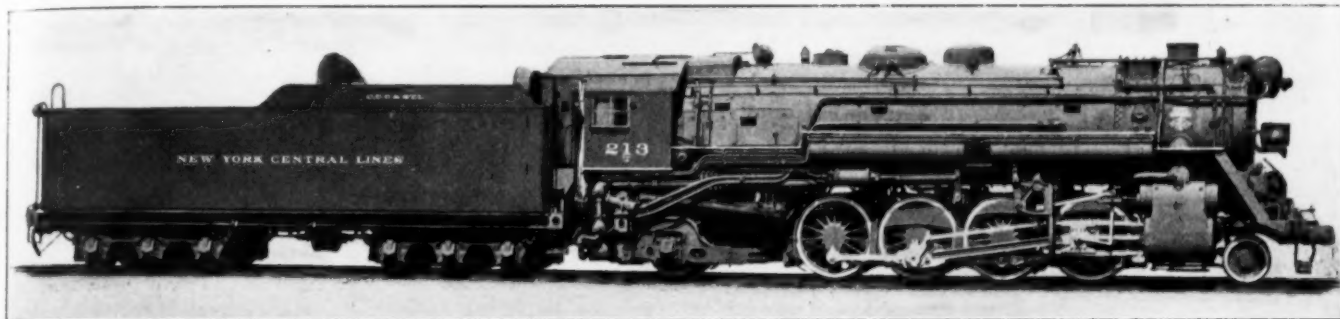
Opponents of the three-cylinder locomotive have, in the past, dwelt upon the probable increased maintenance cost due to the introduction of the third cylinder, but this objection seems to be obscured by the increase in revenue producing capacity. The characteristics of this type are sufficiently well known that no description here is warranted. There is, however, one proposed three-cylinder design that is worthy of especial mention. The Southern Pacific has recently placed an order for a 4-10-2 type locomotive, the first of this wheel arrangement. With a tractive force of 76,900 lb., not including the booster, and a weight of 306,000 lb. on drivers, it predicts the possibilities of eventually producing a non-articulated locomotive with a conventional type boiler which approaches the Mallet in hauling capacity without the attendant objectionable features of an extreme wheelbase.

D. & H. High-Pressure Consolidation

The most striking motive power development which has culminated within the past year is the Muhlfeld high-pressure, cross-compound 2-8-0 type locomotive of the Delaware & Hudson, which has been in service during the past three months. The underlying purpose of this design is to make available the marked thermal advantage of increased steam pressure. This largely accounts for



The Tender on This Baltimore & Ohio 2-10-2 Type Locomotive, with a Capacity of 15,800 Gallons of Water and 23 Tons of Fuel, is Typical of the Tendency Toward Large Capacity Tenders—Total Weight of Engine, 434,500 lb.; of Tender, Loaded, 294,200 lb.; Tractive Force, 82,800 lb.—Built by Lima



New York Central Lines Mikado, Built by Lima—Tractive force: Engine, 63,500 lb., with Booster, 74,700 lb.; Total Engine Weight, 334,500 lb.; Tender, Loaded, 270,000 lb.; Tender Capacity, 15,000 Gal., 18 Tons

the innovation of the water-tube firebox, and for the re-introduction of cross-compound cylinders. The opportunity offered by the complete departure from conventional firebox construction has been utilized to obtain other important but incidental advantages tending still further to increase the thermal efficiency. Carrying a working boiler pressure of 350 lb., this locomotive is rated at over 80,000 lb. tractive force, simple, and over 100,000 lb. with the tender booster in operation. It has developed a dynamometer drawbar pull of 65,000 lb. at a speed of 10 miles an hour.

Aside from the question of reliability and maintenance cost, which only time can determine, the most apparent limitation of this locomotive is the unusually large load carried on the drivers, which averages approximately 74,600 lb. per pair. To many railroad officers such loads will undoubtedly be considered excessive.

Among the year's developments in this country which are of somewhat lesser importance though worthy of special mention are the oil-electric locomotive and the tendency toward locomotive tenders of much larger capacity. A recent order for fifty 15,000-gallon tenders for the New York Central is typical of the latter trend in equipment design.

Diesel Developments

An oil-electric switching locomotive was produced jointly by the General Electric Company and the Ingersoll-Rand Company, which embodies the combination of a six-cylinder solid injection type oil engine and a direct current generator driving four motors without intervening accelerating resistances. This has resulted in a remarkably flexible and economical form of motive power and, which, if experience proves its practicability when adapted to units of greater hauling capacity, should materially aid in the efforts being made to utilize the oil engine, with its low operating cost, for the propulsion of railway locomotives.

The Diesel type of engine, with a hydraulic transmis-

sion, has been used in several locomotives recently produced in Europe. These, however, have been comparatively low-powered units, for switching service, and offer little of immediate value for American conditions.

European Developments

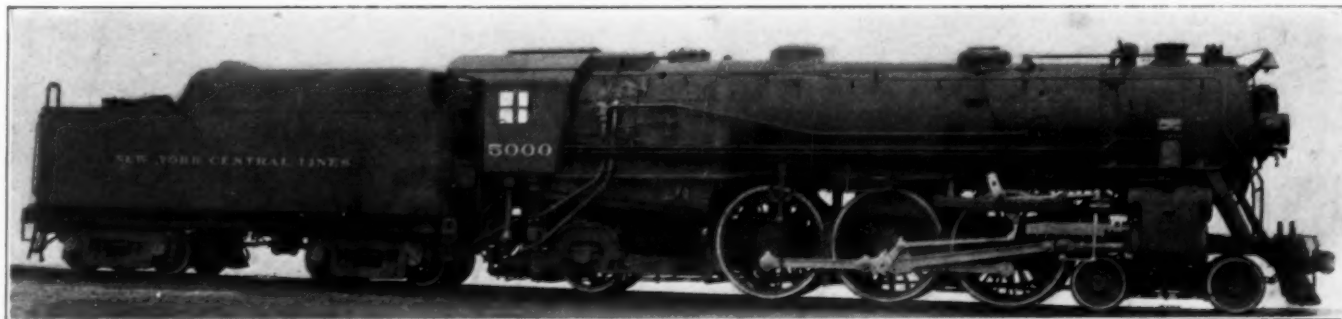
The Zoelly turbine and the Ramsay turbo-electric locomotives have created considerable comment among American railway men. The relatively high cost of fuel has been the dominant factor influencing European designers. For that reason their attention has apparently focused upon the condensing turbine drive, with its admittedly low steam consumption and consequent high fuel economy. The production by the Krupp Company, Essen, Germany, of a condensing locomotive using a 2,000-hp. Zoelly turbine as a prime mover represents a development of this type which so nearly approaches American motive power requirements that its progress is worthy of close observation.

The Stumpf unaflo system, after several unsuccessful attempts, has apparently become a factor to be considered in locomotive design. Its progress is particularly interesting because of the possibility of adapting the unaflo principle to existing power.

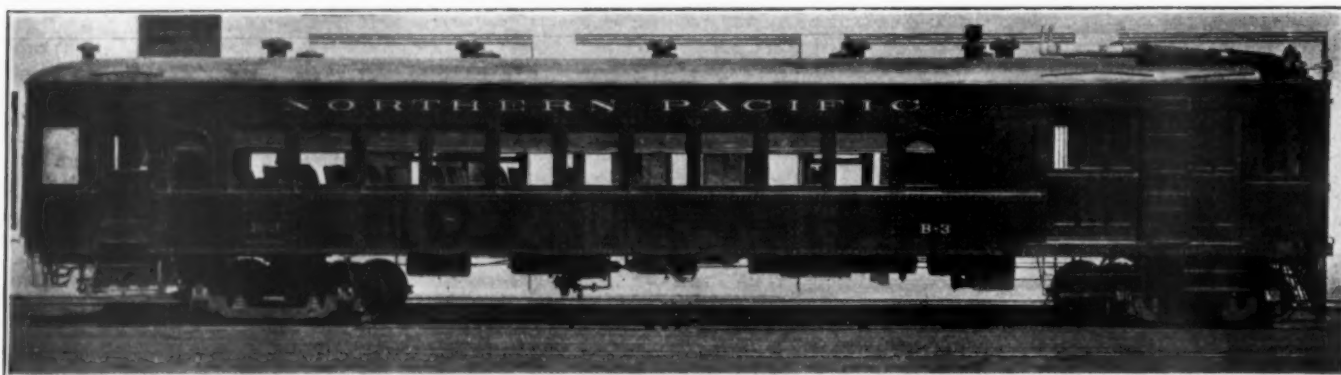
Rail Motor Cars

Rail motor cars have continued to demonstrate their ability to meet the need for economically handling small units of traffic. In the aggregate, there is a large amount of this small unit transportation which can be made to produce a profit for the railroads.

The tendency of the design continues toward the development of cars with a larger power reserve. This is a natural trend because it is not economical to require a gasoline engine to run continuously at high points on the horsepower curve; an overloaded engine requires frequent repairs which result in high maintenance costs. Among other auxiliaries on rail motor cars, the lighting arrangement—Storage batteries for lighting purposes have not given



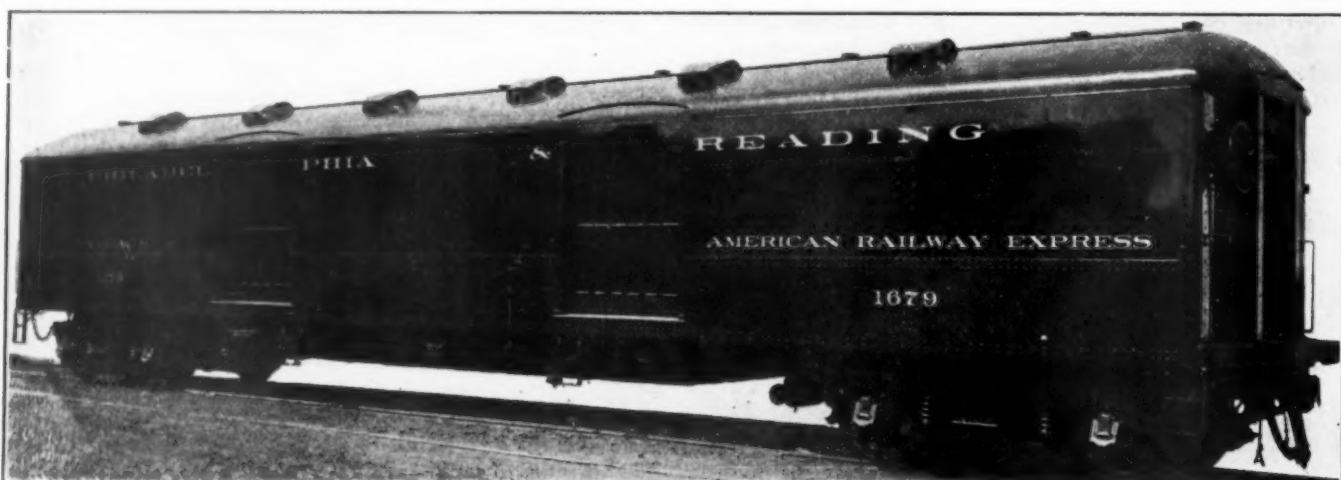
Pacific Type Locomotive Built by American Locomotive Company for Experimental Service on the N. Y. C. Lines—Tractive Force: Engine, 40,700 lb., with Booster, 50,500 lb.; Total Engine Weight, 303,000 lb.



The Gasoline-Electric Car Has Returned to the Rail Car Field—a Product of the Electro-Motive Company, Cleveland, Ohio

entirely satisfactory results and independent lighting equipment is coming into use. The possibility of the application of axle lighting equipment to rail motor cars has

structure and increasing the ruggedness of the trucks so that they may operate satisfactorily on steam railway lines. The past year has seen an effort to conserve floor space

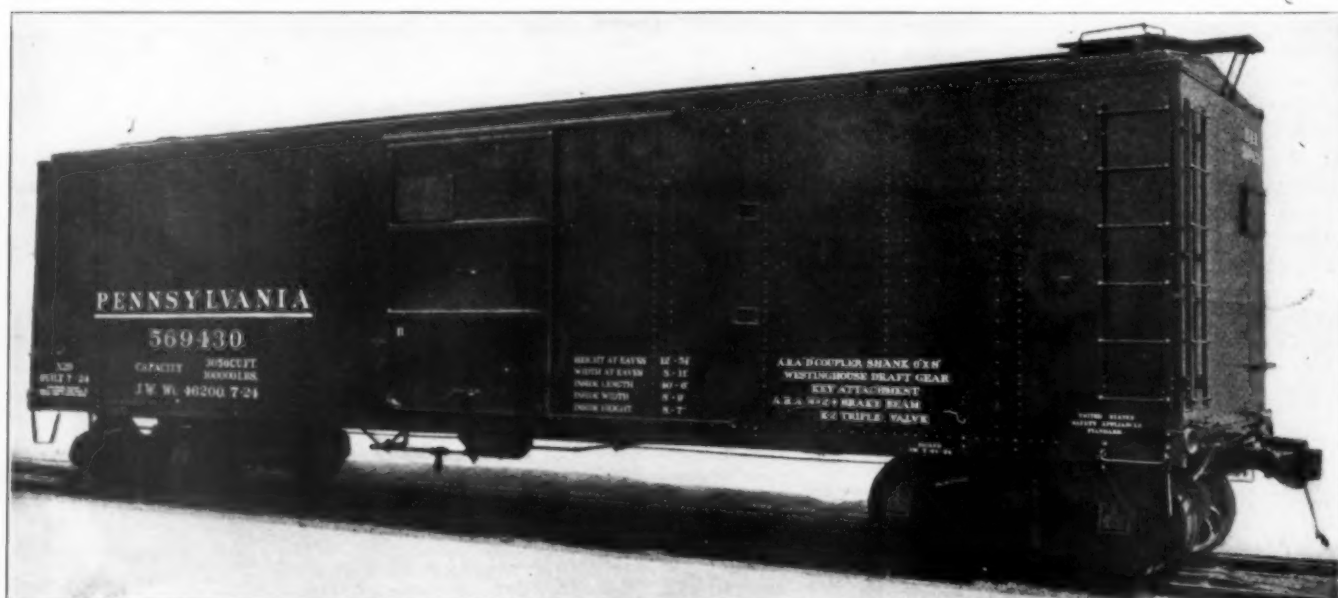


A Philadelphia & Reading Baggage and Express Car, Built by the American Car & Foundry Company—Turtle-back Roof Construction is Unusual on Eastern Roads

received some consideration, but this is still a problem for the future.

The present tendency is toward lightening of the super-

by placing the power units under the floor of the car. This seems to be a step in the right direction as floor space is an important factor in cars of this type, in which



Pennsylvania 100,000-lb. Capacity Steel Sheathed, Wood Lined Box Car of Proposed A. R. A. Standard Design—Orders for 18,000 of These Cars Were Placed During 1924

the weight limitations are necessarily severely restricted.

Two of the outstanding developments of the year have been the twin motor rail car built by the Edwards Motor Car Company for the Chicago, Burlington & Quincy and the gas-electric cars developed by the Electro-Motive Company and the General Electric Company for the Chicago Great Western and the Northern Pacific. The first car is equipped with two four-wheel trucks into each one of which has been built a complete power plant. This is a marked innovation in that it takes the power plants completely out of the car body and provides each power unit with a short, rigid wheel-base, which is well adapted to the mechanical transmission system.

The second car mentioned is driven by a 175-hp. gasoline motor direct connected to a 110-kw., 700-volt generator which supplies power to two railway motors mounted on the power truck. This truck is a high speed electric railway type, built with M. C. B. journals and bearings and equipped with two 105-hp. General Electric railway motors. This marks a revival of the gas-electric transmission which was applied to a rail motor car by the General Electric Company in 1908. In that case, however, the motor was of large bore and stroke, running at comparatively slow speed, while the present installation

is completely settled, there will probably be no marked innovations in the design of the types of equipment to which they apply and on this settlement probably depends the future activity of the Mechanical Division with respect to other types of cars.

But notwithstanding the long uncertainty as to their fate, these designs and the recently adopted standard construction details of the Mechanical Division are having a real influence on car construction. While few railroads have specified complete adherence to them, they are serving as the basis or point of departure in the design of much of the box car equipment built or building in 1924. The A. R. A. standard center sill sections are gaining adherents and are being employed in new construction to a considerable extent in spite of an unfavorable price differential charged for these sections by the mills, as compared with standard structural material. This handicap, however, can hardly be considered as permanent and, as the demand increases the tonnage of these sections, they will undoubtedly be obtainable at current structural steel prices.

Passenger Cars

In considering the developments of 1924, little can be said with respect to the structural design of passenger



Virginian All-Steel Gondola, with Six-Wheel Trucks, Built by the Pressed Steel Car Company

embodies a modern, high speed gasoline engine of comparatively small piston displacement.

The development of the high speed Diesel engine as a prime mover for self-propelled cars has received but little attention in this country during the past year. It is still being worked on by European designers, but the space limitations set up for the construction of this type of car is an obstacle which is difficult to overcome.

Freight Cars

The question of outstanding interest in the field of freight car design is the ultimate status of the proposed A. R. A. standard designs for single and double-sheathed box cars. These designs, which are the result of the work of a committee representing more than two-thirds majority of the members of the Mechanical Division required to secure their adoption, were first presented at the 1923 meeting of the division. Since that time they have been through many vicissitudes of letter ballots, reconsiderations and slight modifications and the double-sheathed steel design is now back in the hands of the Mechanical Division for further consideration because of considerable objection to the inside dimensions on the part of members of the general Committee of the Mechanical Division. Until the future status of these designs

cars. The principal developments have had to do with interior arrangement and with more originality of expression in the esthetic side of interior finish.

The most pronounced innovation during the year was probably the adoption of an unsymmetrical seating arrangement in cars used for suburban service, which provides for two persons per seat on one side of the aisle and three persons per seat on the other side of the aisle. The maximum seating capacity is thus increased by approximately one-fourth in a class of service where seating capacity is at a premium during comparatively short periods of time. This arrangement is used notably on the New York, New Haven & Hartford in the east and on the Missouri Pacific in the west.

The Pullman Company during the past year has developed a distinctive treatment of the interior decorations of its parlor cars for use on certain preferred lines which not only adds variety to the general character of interior appearance, but represents in itself a most pleasing and harmonious effect. Apparently the reaction from the elaborately carved and over-decorated type of interior finish commonly incorporated in all cars 40 years ago, has run its course and, if present indications continue, the end of the period of monotonous severity of interior treatment is at hand.



Grading on the Southern Pacific of Mexico's New Line

Outcome in Mexico Still in Doubt

Government operation not paying—but could private companies remain solvent?

By W. R. Long

Transportation Division, Bureau of Foreign and Domestic Commerce

WILL the government return the railways now under their control to private interests?—this is the underlying theme of the Mexican railway situation. To discuss the railways of Mexico is to become involved in a discussion of this question. To attempt to answer it is to align oneself against much opposition. The

The effect of these schemes is not yet known. To look at the other side, the manner in which the roads are operated, is to see but one alternative—that is the return of the roads to private ownership. Can this be done? If so, can they hope to remain solvent? If they are forced into insolvency and cease operation the government will again take them over and the same situation will exist.

The National Railways of Mexico operate 8,440 miles of line, formerly operated by 20 private companies. These roads form a network which connects north, south, east and west boundaries of Mexico with one another. On the Texas border the system has four connecting links with United States lines, at Matamoras, Laredo, Eagle Pass and El Paso. The connecting roads on the United States side of the border are American controlled and American owned, with the single exception of the Texas Mexican, secured by the National Railways of Mexico some time ago. Working agreements have been effected, however, so that the delay on shipments and reconsignment through the custom house has been reduced to seven or eight days.

On the Guatemalan border an opposite situation exists. There the Pan-American Railroad—that member of the National Railway system which connects Mexico City with the Guatemalan border and with the International Railways of Central America—has been the scene of many battles, and its trackage has frequently been torn up; just now approximately the last 10 miles of the line are out of operation. Across the river Suchiate, which forms the Mexican-Guatemalan border at the intersection of the two roads, numerous bridges have been constructed, only to be wrecked during the next revolution. At the present time General Rubin Culebro holds a concession for the building and operation of an international bridge across the river, but its construction is problematical.

An added hindrance to international transportation on the Guatemalan border is the fact that the gage of the Pan-American Railroad is not the same as that of the International Railways of Central America, whose lines



Carrying Supplies for Construction, S. P. de M.

middle way is the easier, and there appear excellent reasons on both sides of the question. Freight rates are extremely high; a federal surcharge of 10 per cent and a stamp tax of 2.2 per cent have been enacted by the government on the freight moving over the national system, and still it is not paying dividends. Is this due to the manner in which the roads are operated, or is it due to the meagre quantity of traffic handled?

Evidently the officers charged with the operation of this system feel that the latter reason is responsible. They are trying out all kinds of schemes intended to increase traffic.

terminate at Ayutla on the Guatemalan side. Accordingly it is necessary to transfer both passengers and freight across the river—a task which at the present time is accomplished by means of a footbridge for passengers and by lighters for freight.

Even under conditions of peace it is true that delay in perfecting international transit on this border would prove advantageous to the state of Chiapas, since customs receipts would be greater if the state's chief agricultural product, coffee, were shipped from its own ports than if exported through ports of Guatemala.

Important Concessions

Many concessions have been granted by various governments of Mexico for the construction of railroads. Prac-



Construction Camp on the Southern Pacific of Mexico

tically few of these, however, have been completed, and of those that are now valid still fewer have the least possibility of being constructed. The most important ones are: The National Railway of Lower California, to run from Mexicali to San Felipe, and the line from Mazatlan to Durango—both aided to some extent by the government and both now having their construction mentioned in connection with the Southern Pacific; a road to run from Bahia de la Roca to the northern frontier, for which the concession was authorized on June 14, 1920; several minor concessions to the National Railways for extension of their main lines and branches; a concession for a line from the Tehuantepec National Railway to connect with the Yucatan system; and one extending along the northern border of Sonora, connecting Naco with Guzman.

At the present time there are 4,765 miles of independent railway in operation. Of these the two outstanding examples are the Mexican Railway, Ltd., which connects Mexico City with the port of Vera Cruz, and the Southern Pacific of Mexico, the principal artery of transportation on the West coast. The first is the oldest independent line in Mexico, dating back to 1833. The line was finished during the period from 1861 to 1872. Its mileage today, including branches, is 470.

From 1907 to 1914 the railway suffered little from the disturbed conditions prevailing in Mexico; but beginning with the American occupation of Vera Cruz in 1914, during which period a portion of the track was torn up, the road suffered very greatly, being the scene of battles and assaults on trains; a large part of its rolling stock and even entire buildings were destroyed. The Carranza government took over the road on November 18, 1914, and operated it for its own profit until December 31, 1916, when it was returned to its owners. On April 2, 1917, it was again taken over by the government and was not again returned to its owners until June 19, 1920. This line has numerous branches.

Since May 21, 1923, the Mexico-Tampico Railway, variously known as the Short Line Railway, the Honey

Concession, etc., has been under the administration of the Mexican Railway, which obtained a concession on that date. The construction of this road was authorized in a concession, valid for 99 years, granted July 16, 1912, to Richard Honey, for a railway to connect Mexico City with Tampico. The building of a steel truss bridge over the Panuco river was included in the contract. Work was started immediately and about 52 miles of track were laid from Pachuca (at the Mexico City end) to Ixmiquilpan, Hidalgo. Work was started also from the Tampico end. No construction work has been done since 1913, but the Mexican Railway has made some new surveys and inaugurated preliminary work. The railway when completed will run from Pachuca to Tampico, via Actopan, Ixmiquilpan, El Higo and Panuco. About 186 miles remains to be constructed. It is understood that the Tampico-Panuco Valley Railway is to be utilized in the last stretch.

The Southern Pacific of Mexico

The Southern Pacific of Mexico dates back to 1898 when the Atchison, Topeka & Santa Fe leased the Sonora Railroad to this company, which thus obtained an entrance to the port of Guaymas. In 1903 the Southern Pacific acquired control of the Ferrocarril Cananea, Rio Yaqui y Pacifico, a 38-mile road running from Naco, the connecting point with the E. P. & S. W. and the Cananea Consolidated Copper Company at Cananea, Sonora. This road was constructed under the direction of the Santa Fe in 1901. In 1904 J. A. Naugle, under instructions from E. H. Harriman, made a trip from Guaymas, Sonora, to Guadalajara, Jalisco. His report was such as to cause immediately to be organized a company headed by Epes Randolph, which on October 27, 1905, obtained a conces-



Railway Construction in Mexico

sion for the construction of a line between the two above-mentioned points. This line was built, and since that time several branches have been added.

In 1913, because of the revolution, construction was suspended. At Orendain, an extremely isolated city, there was constructed a branch of about 100 miles which joined the Guadalajara Marcos extension of the old Mexican Central, offering through communication to Mexico City from Orendain on November 3, 1910. However, the Southern Pacific interests had received a concession for an independent line from Guadalajara to Mexico City in 1909.

Work on the stretch, however, connecting Tepic and Orendain junction was not inaugurated until March 5, 1923, when ground was broken for this construction

which is to continue for 100 miles. In this section more than 30 tunnels will have to be bored and 40 bridges will have to be constructed. The estimated cost of the construction is \$12,000,000.

Due to revolutions the company has accumulated a claim against the Mexican government of 32,000,000 pesos, through which under an agreement dated March 2, 1923, the railroad company, in partial settlement of its claims, received notes from the Mexican government aggregating 13,600,000 pesos payable at the rate of 200,000 pesos per month, or an aggregate of 2,400,000 pesos per annum. Of the notes so received, notes aggregating 2,400,000 pesos, which matured during the last nine months of the year 1923, and the first three months of 1924, together with the interest thereon, have been paid off. Under the agreement the government pledges itself to study and settle equitably and promptly the balance of the railroad company's claim, amounting to 10,465,000 pesos, the amount to be paid to be based on adequate evidence, and when agreed upon to be covered by notes. During the year a representative of the government completed an investigation of these accounts and an early adjustment is expected.

The agreement with the Mexican government provides for the completion by the railroad of the 100-mile gap in

The work of rehabilitating the Tonichi and Alamos branches was also begun in March, 1923, and 39 miles, or 43 per cent of the former, and 23 miles, or 57 per cent of the latter, was completed during the year. The total mileage of the Southern Pacific of Mexico, including branches, is 1,243.

There has been some talk of the company's taking over the uncompleted road which the government has been building from Mexicali to San Felipe, but at present no definite action has been taken on this project. It also has been stated that the company proposes to construct a railroad which will connect the city of Durango with the port of Mazatlan. This section, however, is almost all in



Concrete Foundations for a Trestle

the main line between Tepic and La Quemada; and the rehabilitation by the railroad company of the Tonichi branch, about 90 miles in length, and of the Alamos branch, about 40 miles in length, which had been partially destroyed by revolutionary forces; work on the main line was begun on March 6, 1923, and although the work was delayed by heavy rains, about 45 miles of right of way were cleared, and 20 miles of roadway graded, upon which 9 miles of track were completed during the year. As of March 15, 1924, a force of 3,363 men were engaged upon this work, at which date an aggregate of 25 miles of grading had been completed and $6\frac{1}{2}$ miles were nearing completion.



Building a Concrete Culvert on the S. P. de M.

the Nayarit mountains, and it is necessary to spend large sums of money and much work as special construction is needed. Recently the company has taken over the Nacozari Railway, and it is expected that this line will be extended from Nacozari to Tonichi in order to connect with the branch line of the Southern Pacific at that point.

Kansas City, Mexico & Oriente and Other Lines

The Kansas City, Mexico & Oriente was first seriously considered in 1900. It was to extend a distance of 1,189 miles, 740 in the United States and 449 in Mexico. The road was divided between two companies, one holding the trackage in Mexico and the other that in the United States. Both of these companies are now in the hands of a receiver. In Mexico approximately 238 miles of line has been laid, with its terminal at Topolobampo in Sinaloa; practically none of this is now in operation. The company is endeavoring to secure a loan from the Mexican government to be utilized in constructing the link which would connect the road from its Chihuahua end at Falomir with Presidio on the border. On October 1, 1924, it was reported that the road had been successful in obtaining 25,000, and the privilege of bringing into Mexico 3,000 tons of railroad material free of duty, from the Mexican government.

The Northwestern Railway, extending from El Paso to Tabalaopa in Chihuahua, a distance of 81 miles, has its name now linked with the Kansas City, Mexico & Oriente in the question of advisability of merging the two roads. At one time the Northwestern promised to be one of the principal arteries of transportation in Mexico, but that hope has met with complete failure. Whether the above-mentioned merger will go through is not known, although part of the Kansas City, Mexico & Oriente is now operated over the tracks of the Northwestern, and doubtless the financial condition of both roads would be greatly benefited by such an arrangement.

The Ferrocarril de Coahuila y Zacatecas (98 miles long) is owned and operated by the Mazapil Copper Company, a British concern, with head offices in Manchester, England, and the operating offices in Saltillo, Coahuila, Mexico.

Tehuantepec National Railway

In 1824, three years after Mexico received her independence, the government engaged contractors to open a rail route across the Isthmus of Tehuantepec. In 1824 the dictator, Santa Anna, granted a concession to Jose de Garay for the purpose of constructing a through unit of transportation by land and water from coast to coast. No work was done under the concession, however, nor under many similar ones which were granted later until 1870, when actual construction work was begun. Work progressed slowly, however, and many new concessions were made, invalidated and revalidated until 1894, when it was finally completed.

With the completion of the road it became necessary for the government to decide on the method of operation. It was constructed piecemeal without satisfactory terminal ports. It became necessary then to provide terminal ports equipped with accommodations for shipping and facilities for the quick and businesslike handling of cargo. In view of these necessities Congress authorized the government to enter into a contract with a private firm for the operation of the Tehuantepec Railroad and terminal ports in 1896. In 1898-1899 contracts to this effect were entered into with S. Pearson & Son, Ltd., a British company.

During the change in government the road remained a separate unit until December 31, 1917, when the Senate passed a bill for the cancellation of the contract. Although this did not become a law until January 19 of the following year, the formal dissolution of the partnership was made on December 15, 1917.

Upon the dissolution of the partnership the government took over the road's liabilities, which included a debt of more than 20,000,000 pesos. The road was immediately placed under the administration of the National Railways of Mexico and was operated by them until June 30, 1924, when it was turned over to the board of directors of free ports of the Department of Communications, and is now operated by them. During the first two years all operations under government administration showed a profit. From that time on, however, it was operated at a loss.

Whether the fact that the government on June 30, 1924, officially opened two free ports, and one free zone, along the right of way of this road will benefit its traffic remains to be seen. It is expected now that the road will at first be operated at a loss of approximately 70,000 pesos a month.

The other independent lines of the country are more or less of little importance, being chiefly privately owned mineral roads.

Government Aids to Transportation

Various methods have been adopted by the government to stimulate both railway and steamship traffic. Recently a decree authorized the National Railway system to establish, with steamship companies flying the Mexican flag, a reduced combination freight traffic on exports and imports. Over the decree there has been considerable complaining by the various foreign lines calling at ports in Mexico. The National Railways have authorized through bills of lading from inland points in the United States via the Ward or Munson Lines, via Tampico or Vera Cruz, to interior points in Mexico.

A through package car service also has been inaugurated from Chicago to Mexico City, under which mixed

merchandise will be consolidated into carload shipments at Chicago and consigned to one common forwarding agent at the border. Goods will be unloaded, revised and reloaded at Laredo and then billed to Nuevo Laredo across the border and switched into the Mexican custom house for clearance. The first car to be operated under this plan arrived at the border within six days after it left Chicago, and was cleared through the custom house and started on its way to Mexico within 24 hours. This represents a great saving of time, as it has usually taken from two to eight days to reconsign the merchandise at the Mexican border and clear it through the Mexican custom house. The service was inaugurated with two cars, and since then it has been extended to four or five cars. In addition, a service is being operated over the same route from St. Louis.

On August 30, 1924, the National Railways inaugurated a through sealed package car service, for less than carload shipments of general merchandise, from Tampico to Guadalajara, the running time of which is six days. Weekly steamer service has been established between New York and Tampico via the Ward and Munson lines, and through package cars are being operated by the latter as cargo offers. Shipments originating in points in the Eastern trunk line territory, moving via either of the two above-mentioned lines, may be forwarded on through bills of lading from New York to all points on the system's lines.

Mexican Railway Officials

Urge Border Trade Stimulation

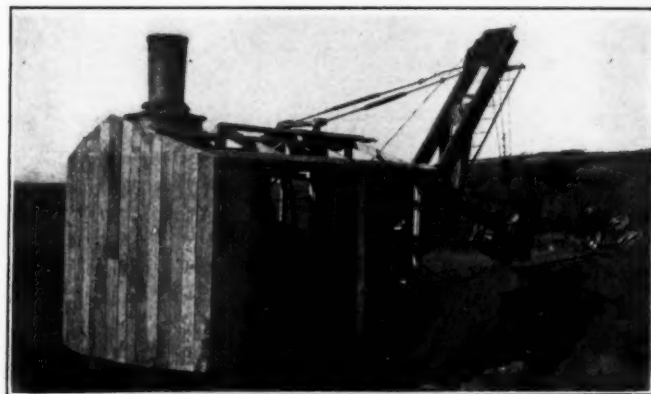
The United States Chamber of Commerce has recently had brought to its attention a report by three officials of the National Railways of Mexico on "How Interchange of Business Between Mexico and the United States May Best Be Stimulated." This report was submitted at the annual meeting of the American Association of Railroad Superintendents, held in June, 1924. The four principal recommendations are as follows:

A co-ordinated study should be made of the rates that will encourage all rail movement to and from Mexico.

An immediate study should be made for the resumption of through billing and interline settlements, which service offers material advantage to shippers and consignees.

The establishment of designated customs brokers is recommended to simplify customs handling, economical and uniform charges, and expeditious movement.

The adoption of uniform practice in the interchange of cars is recommended—that is, one line to do all the work of receiving and delivering cars.



Modern Railway Construction Methods in Spain—an American Steam Shovel

The Progress of Consolidation

*I. C. C. authorizes acquisition of control of nearly
12,000 miles of road*

By H. F. Lane

ALTHOUGH the Interstate Commerce Commission has not yet issued the final consolidation plan provided for in Section 5 of the interstate commerce act, and therefore consolidations in the technical sense of that law cannot yet be effected, considerable progress in the direction of the consolidations proposed in the tentative plan of August 3, 1921, has been made under the authority conferred upon the commission in paragraph 2 of Section 5 to authorize the acquisition of control of one carrier by another "in a manner not involving the consolidation of such carriers into a single system for ownership and operation."

The authorizations for the past year include the acquisition by the Missouri Pacific of a one-half interest in the Denver & Rio Grande Western and of control of the Texas & Pacific and the Gulf Coast Lines, including the International-Great Northern; control of the El Paso & Southwestern system by the Southern Pacific, which in 1923 was permitted to acquire the Central Pacific; and control of the Carolina, Clinchfield & Ohio by the Atlantic Coast Line and the Louisville & Nashville. In the case of the Missouri Pacific particularly the authorizations go a long way toward bringing under a single control a large part of proposed System No. 19, Chicago-Missouri Pacific,

of the commission's tentative plan, although the Chicago & Eastern Illinois and the Kansas City Southern, which the plan groups with the system, are not included, and the tentative plan places the Denver & Rio Grande Western and the Western Pacific, which was also authorized to acquire a half interest in the D. & R. G. W., in another system. The Missouri Pacific-Denver & Rio Grande Western-Western Pacific system, together with the Texas lines, make a total of about 15,000 miles, although not operated as a single system as proposed by the consolidation plans.

The combination of the Nickel Plate lines with the Chesapeake & Ohio, Erie and Pere Marquette, which represents one of the outstanding developments of the year, has not yet reached the stage of application to the commission for authority, but the outcome is awaited with interest because of the extent to which it contravenes the tentative plan and executives of the other eastern roads are trying to work out a plan to suggest to the commission for the grouping of the other lines to fit the conditions which would be created by the Van Sweringen merger.

While comparatively few acquisitions of roads not already controlled have been made in this way, the integration of railway systems, i.e., the bringing of sub-

Carrier acquiring control	Control acquired	
	Owning company	How acquired
Atchison, Topeka & Santa Fe Ry. Co.	California Southern R. R. Co.	Purchase of stock.
Do.	Grand Canyon Ry. Co.	Lease.
Do.	Oklahoma Central R. R. Co.	Do.
Do.	Rocky Mountain & Santa Fe Ry. Co.	Do.
Do.	Salina & Santa Fe Ry. Co.	Purchase of stock and lease.
Atlantic Coast Line R. R. Co. and Louisville & Nashville R. R. Co.	Carolina, Clinchfield & Ohio Ry. Co. and Clinchfield & Ohio Ry. of S. C., and Clinchfield Northern Ry. of Ky.	Lease.
Chicago, Rock Island & Pacific Ry. Co.	Keokuk & Des Moines Ry. Co.	Do.
Colorado & Southern Ry. Co.	Wichita Falls & Oklahoma R. R. Co. of Oklahoma.	Purchase of stock.
El Paso & Southwestern Co.	Dawson R. R. Co., El Paso & Rock Island Ry. Co., El Paso & Northeastern Ry. Co., Alamogordo & Sacramento Mountain Ry. Co., El Paso & Northeastern R. R. Co.	Exchange of securities.
El Paso & Southwestern R. R. Co.	Dawson Ry. Co., El Paso & Rock Island Ry. Co., El Paso & Northeastern Ry. Co., Alamogordo & Sacramento Mountain Ry. Co., El Paso & Northeastern R. R. Co., Burro Mountain R. R. Co., Arizona & New Mexico Ry. Co.	Exchange of capital stock.
Do.	Dawson Ry. Co., El Paso & Rock Island Ry. Co., El Paso & Northeastern Ry. Co., Alamogordo & Sacramento Mountain R. R. Co., El Paso & Northeastern R. R. Co., El Paso & Southwestern R. R. Co. of Texas.	Lease.
Georgia & Florida Ry.	Statesboro Northern Ry.	Purchase of stock and lease.
Gulf, Colorado & Santa Fe Ry. Co.	Concho, San Saba & Llano Valley R. R. Co.	Lease.
Do.	Pecos & Northern Texas Ry. Co.	Lease.
Kansas City, Kaw Valley & Western Ry. Co.	Kansas & Missouri Railway & Terminal Co.	Purchase of stock.
Kansas City Southern Ry. Co.	Do.	Do.
Lehigh Valley R. R. Co.	Delaware, Susquehanna & Schuylkill R. R. Co.	Lease and retention of stock ownership.
Lehigh Valley R. R. Co. and Reading Co.	Ironton R. R. Co.	Purchase of stock.
Missouri Pacific R. R. Co.	Denver & Rio Grande Western R. R. Co.	Do.
Do.	Texas & Pacific Ry. Co.	Do.
Do.	New Orleans, Texas & Mexico Ry.	Purchase of stock.
Morgan's Louisiana & Texas Railroad & Steamship Co.	Franklin & Abbeville Ry. Co.	Purchase of stock.
New Orleans, Texas & Mexico Ry. Co.	Houston & Brazos Valley Ry.	Do.
Do.	International-Great Northern R. R. Co.	Do.
New York, Ontario & Western Ry. Co.	Utica, Clinton & Binghamton R. R. Co., and Rome & Clinton R. R. Co.	Lease.
Oklahoma City-Ada-Atoka Ry. Co.	Missouri-Kansas-Texas R. R. Co.	Do.
Do.	Oklahoma City Shawnee Interurban Ry. Co.	Do.
Panhandle & Santa Fe Ry. Co.	Pecos & Northern Texas Ry. Co.	Lease.
St. Louis-San Francisco Ry. Co. and Kansas City, Fort Scott & Memphis Ry. Co.	Kansas City, Clinton & Springfield Ry. Co.	Lease and acquisition of stock.
Seaboard Air Line Ry. Co.	Florida Western & Northern R. R. Co.	Purchase of stock and lease.
St. Louis Southwestern Ry. Co. of Texas.	Stephenville North & South Texas Ry. Co.	Lease.
Southern Pacific Co.	Arizona Eastern R. R. Co., Phoenix & Eastern R. R. Co.	Do.
Do.	El Paso Southwestern System	Purchase of stock and lease.
Total		11,965.37

¹ One-half interest.

subsidiaries into closer relationship with the parent company, such as by long term leases or by outright purchase, is proceeding at a rapid pace, while President Coolidge and others of the administration at Washington are still urging amendments to the consolidation provisions of the law to expedite the grouping of the railways of the country by voluntary action into a smaller number of systems of approximately uniform strength, without the restriction of a general plan.

During a little over four years since the transportation act became effective the Interstate Commerce Commission has authorized the acquisition of control of one carrier by another in 93 cases out of 111 applications filed, and during the year ended October 31, covered by its annual report for 1924, it granted 33 out of 34 such applications, involving 10,928 miles of road. In the previous year it had granted 16 out of 24 applications, involving 4,009 miles, in 1922, 24 out of 28 applications, and in 1921, 19 out of 25 applications.

While many of the cases already authorized by the commission represent merely the closer integration of existing systems, such as by the lease of small subsidiaries separately organized for construction purposes or of lines formerly controlled through stock ownership, the extent to which the process is going may be noted from the fact that the number of Class I railroads filing separate reports with the commission has been reduced from 204 in 1920 to 193 in 1924, in spite of the fact that several roads have in that time been graduated into Class I by the increase in their traffic and earnings. This indicates at least one of the economies that are looked for from the consolidation process, the saving in accounting and reporting, and in most instances other savings in operating expenses as well as other advantages have also resulted. A glance at the lists of roads whose acquisition has been authorized by the Interstate Commerce Commission since the passage of the law shows that several of our largest

railroad systems have been able to simplify their corporate structure by the absorption of small lines.

The Class I railroads which were included in the 1920 list but which by reason of absorption in some form are no longer required to report separately, with the system in which they are now included, are as follows:

Chicago Junction (New York Central),
Chicago, Terre Haute & Southeastern (Chicago, Milwaukee & St. Paul),
Cincinnati, Lebanon & Northern (Pennsylvania),
Cumberland Valley (Pennsylvania),
Grand Rapids & Indiana (Pennsylvania),
Kanawha & Michigan (New York Central),
Lake Erie & Western (New York, Chicago & St. Louis),
New York, Philadelphia & Norfolk (Pennsylvania),
Pittsburgh, Cincinnati, Chicago & St. Louis (Pennsylvania),
Toledo & Ohio Central (New York Central),
Toledo, St. Louis & Western (New York, Chicago & St. Louis).

Hearings on the tentative plan of the commission were completed on December 4, 1923, and arguments were presented during the week of January 7. Since that time the work of preparing the complete plan has been under way but the Administration, at least, has recently shown more interest in Senator Cummins' bill, to promote consolidations during a period allowed for voluntary action by the roads subject to the approval of the commission, than in a pre-conceived general plan and the Senate committee on interstate commerce has announced that hearings on the bill will be resumed on January 7.

The authorizations of control of one carrier by another carrier under paragraph 2 of Section 5 of the Interstate Commerce Act during the year covered by the commission's annual report appear at the bottom of the opposite page.



Ewing Galloway

A Portuguese Passenger Train with Double Decked Cars

Status of Accounts with the Government

By H. F. Lane

MUCH greater progress than was anticipated has been made in the settlement of accounts between the railroads and the government arising from the period of federal control. The largest number and amount of such accounts were with the Railroad Administration, which expects early in January to submit to the President a final report, so far as the railroads whose properties were taken over and actually operated by the government are concerned. With the exception of one or two roads it has now settled the claims of the roads which originally amounted to about \$1,000,000,000, later reduced to about \$765,000,000, and it has not only received from the roads cash or notes for the capital expenditures made by the government during federal control, but it has collected a large proportion of the actual cash, either in the form of payments by the railroads on their notes before maturity or by selling the notes in the market, and turned the amounts into the Treasury.

The Railroad Administration took from the carriers during and as a result of the federal control period funding notes, bonds and equipment trust notes amounting to \$626,909,550, and up to December 1, 1924, it had collected or sold without recourse on the government, \$448,376,750 of this amount, which was paid into the Treasury. An additional \$35,000,000 or \$40,000,000 is expected to be paid in the next six months so that the final amount of the railroad obligations which the Railroad Administration will hold will aggregate about \$140,000,000.

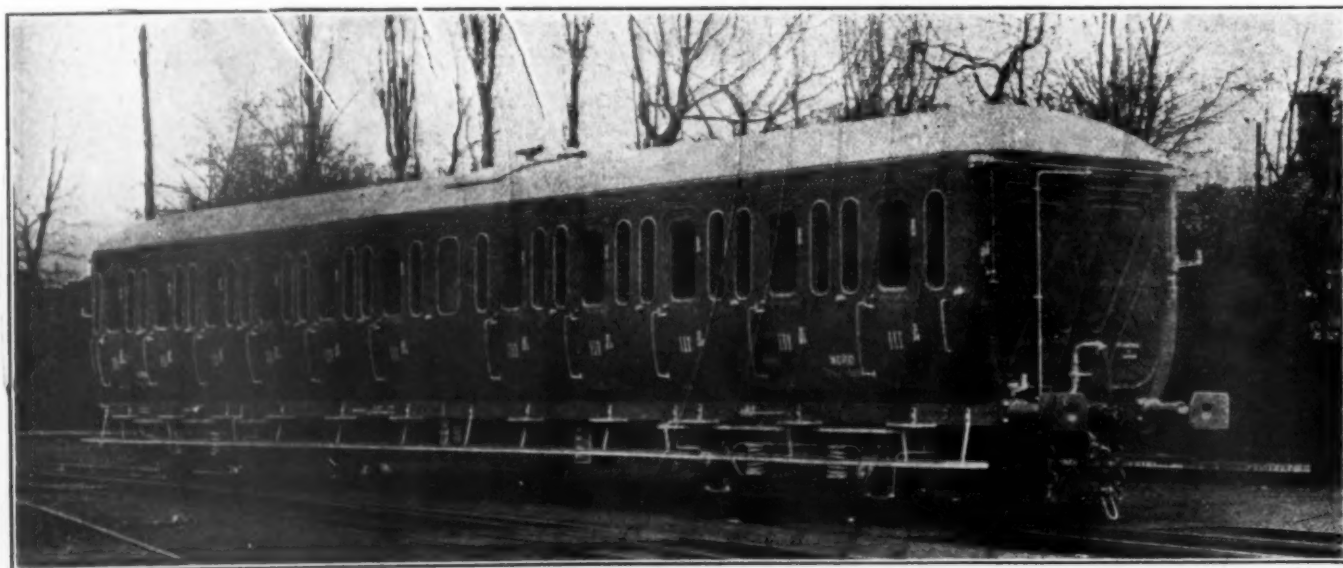
These notes mature in 1930 and bear interest at 6 per cent so that the income will more than pay the overhead expenses of the Railroad Administration for the future in the adjustment of the large amount of unadjusted matters consisting largely of claims of third persons, such as

loss and damage and fire claims, and the claims of short lines which are still involved in litigation. The Railroad Administration therefore is now an income-producing organization for the government.

On November 30, the Railroad Administration had to its credit in the form of unexpended appropriations and the avails of securities taken from the railroads and sold, \$479,377,060, and it held obligations of the railroads aggregating \$180,000,000, making the total of assets \$659,577,064.

In addition to the \$180,000,000 owed by the railroads to the government through the Railroad Administration they also owed the government on October 31, the date of the latest report, \$188,677,673 on account of loans made by the Interstate Commerce Commission from the \$300,000,000 loan fund created by the transportation act, which has been increased by interest and repayments. Of a total of \$350,600,667 loaned from this fund \$161,922,993 had been repaid by the carriers, and there was an unencumbered balance in the fund of \$116,231,845 on October 31.

The claims of the railroads for the six months' guaranty period following the termination of federal control in 1920 amounted to \$657,000,000, but the I. C. C. has considerably reduced this amount in making the adjustments. The commission in its annual report for the year ended October 31, 1924, adhered to its former estimate of \$536,000,000 payable on this account, of which \$507,494,211 had been paid in settlements with 450 carriers, and there were still 94 cases of which disposition had not been made. The commission also has many settlements yet to make of the claims of short lines for the federal control period.



New Experimental All-Metal Passenger Car in France

Statistical Section

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A Statistical Review of the Railroad Year 1924

*Record established for efficient performance—
Still much room for improvement*

By Julius H. Parmelee

Director of the Bureau of Railway Economics

TWO words wrote themselves in bold characters on the records of railway operation during the year 1924: efficiency and economy. Increased efficiency in operation, and reduced cost of operation, these are the significant features of the year just closed.

Following as it did a year of the heaviest freight traffic ever recorded by the American railway system, the year 1924 could hardly have been expected again to break all records. No such expectation was in the minds of those who watched the traffic from month to month, especially after the spurt of the first three months of the year had died down to a quiet summer. But the traffic came back with a rush during the fall, and the final weeks of the year were on a sufficiently higher plane than the corresponding weeks of 1923 to pull the aggregate for the year within hailing distance of the previous record set in 1923. In relation to the factor of traffic volume, therefore, the result of railway operation in 1924 may be regarded as reasonably satisfactory.

But there is another factor which gives even greater satisfaction to all who wish to see the railway systems of the United States an efficient machine for carrying out the transportation phases of production and distribution in the United States. This factor is commonly known as railway performance, and represents the efficiency with which railway operations are conducted. In discussing this factor, the railway managements make no apology for the satisfaction which they feel in the high level of efficiency set during 1924. Railway efficiency does not primarily benefit railway owners, managers, and employees. Far more does such efficiency benefit the general public. It is to the public interest, rather than to any private or special interest, that our transportation systems shall supply that adequate measure of service which is their fundamental function.

In terms of operating performance, it is no exaggeration to say that the year 1924 has set a mark never before surpassed.

This sterling performance may be measured in several ways. While several records were broken during 1924, the present survey is designed rather as an analysis of the more significant items than a detailed summary of all of them. For one thing, the railways during the past year set a new mark for the number of cars loaded with revenue freight in a single week. The peak loading for the year, which occurred during the week ended October 25, was 1,112,345 cars. This peak was greater than the corresponding peak of 1923 by 14,852 cars, and greater than the peak of any previous year by 94,000 cars. Again, during the month of October the aggregate of net ton-miles was greater by nearly one per cent than in any month of any previous year. Thus two records for freight movement were shattered in October: carloadings for a single week, and net ton-miles for a single month.

What is far more important, during the heavy traffic

season of the fall the railways experienced a succession of million-car weeks—eleven during the thirteen-week period from August 24 to November 22—and at the same time had in reserve a surplus of freight cars which ranged between 100,000 and 250,000, as well as a surplus reserve of locomotives running from 5,000 to 7,000. This was a real achievement, for seldom in railway history has record traffic been moved without the accompaniment of freight car shortages, usually accompanied also by a shortage of motive power.

Again, at no time during the year was there serious complaint from shippers of any commodity, in any section of the country, regarding the adequacy or the promptness with which transportation demands were met.

So far, the discussion has limited itself to the freight service of 1924. For the passenger service, statistical records do not tell the story so fully or so exactly as in the case of freight; but a general survey of the situation indicates that the promptness and adequacy of passenger train service in 1924 was greater than in 1923.

The financial results of the year were less satisfactory than the operating results. With a rate of return on investment of only 4.30 per cent, the railways fell below the rate earned in 1923, which in turn was far below the legal rate of 5¾ per cent named in the Transportation Act as a fair return under normal conditions.

Total operating revenues were a quarter billion dollars less in 1924 than in 1920. Operating expenses, however, were reduced more than one and a quarter billion dollars, compared with 1920. A considerable portion of this reduction in cost of railway operation was passed along to the public, which benefited in 1924 alone through reduced freight and passenger rates to the amount of \$670,000,000.

Operating Efficiency

Railway efficiency in 1924 can be assigned to three principal causes. First, railway managements during the past two years have hewn closely to the line they set for themselves in the spring of 1923. The program outlined at that time pledged a consistently greater effort toward efficiency and economy of operation, including a definite policy of additions to equipment and other facilities, as well as a definite goal of operating efficiency. These policies have been, and continue to be, progressively carried out. Second, the railways give due credit to their employees, without whose effective efforts no increase in efficiency is ever possible. Third, the railways have freely expressed their appreciation to the great body of shippers, whose cooperation has stimulated the improved results of the last two years. An important factor in this cooperation is the functioning of the ten Shippers' Regional Advisory Boards, the activities of which are more fully described in another article in the present issue of the *Railway Age*.

The average daily movement per freight car during the

first ten months of 1924 was 26.8 miles, compared with 27.9 miles for the corresponding period in 1923, and 25.1 miles for the whole of the year 1920. While the railways set no goal for themselves in this respect during 1924, and fell somewhat short of the excellent record of 1923, they did achieve some progress during the later months of the year. In October, for example, they averaged 30.66 miles per day, which was only slightly below the average of 30.72 miles in the previous October, and exceeded all other months of record. Never before, except in these two October months of 1923 and 1924, have the railways exceeded the goal of 30 miles per day which they set in 1923.

Actual Car Miles Per Day

In connection with this efficiency factor of car miles per day, it must not be forgotten that the average is computed by including in the divisor all freight cars in service, whether actually in motion, whether standing on industrial tracks for loading or unloading, whether passing through interchange yards or terminals, whether in shop for repairs, or whether set aside as surplus cars for which no traffic is offered. It follows that in a year such as 1924, when heavy traffic is handled with a surplus reserve of cars, the average movement thus calculated appears to be lower than it actually is. The very fact that the railways by rapid and efficient movement are handling a larger traffic with fewer active cars penalizes them in the computation of average speed per car. A more nearly accurate method of computation would be to exclude from the divisor all surplus or reserve cars, and all cars whose presence in the shop for repairs makes them unavailable at the time for transportation service. This would produce a result representing the actual speed of active freight cars only, that is, those which are in serviceable condition and in use for traffic purposes.

Recomputing the average daily movement of freight cars on the basis just indicated, it appears that the year 1924 broke all records. On this basis, the average number of miles per car day was 32.6 miles during the first 10 months of 1924, compared with 31.0 miles in 1923, and 27.8 miles in 1920. In October, 1924, which showed the best results of the year, the corresponding average was 34.9 miles.

As to the average load per car, the railways have somewhat less responsibility than the shippers. In the case of carload traffic, it rests largely with the individual shipper whether he loads a car close to or even above its marked capacity, or whether he stops at or near the minimum load which will give him the carload rate. Again, the character of the commodities offered to the railways for transportation by rail largely governs the average load per loaded freight car. If a large proportion of the traffic consists of coal, loaded to 48 to 50 tons per car, it must follow that the average loading for all cars will be increased. If, on the other hand, the proportion of coal in the total freight traffic is lower than normal, and a larger proportion consists of manufactured products, which may load from 5 to 10 tons per car, it must follow as clearly that the average load for all freight cars will be reduced.

The latter situation is what was experienced in 1924. The proportion of manufactured products in the total freight traffic being higher than in 1923, and the proportion of coal and certain other heavy loading commodities being somewhat lower, the average load per car was reduced below the levels attained in previous years. The proportion of coal loadings fell from 20.5 per cent in 1923 to 18.5 per cent in 1924, while the proportion of merchandise loadings increased from 59.2 per cent to 61.5 per cent.

During the first 10 months of 1924, the average load per car was 26.9 tons, compared with 28.0 tons during the same period of 1923, and 29.3 tons in 1920.

Another factor of operating efficiency, which is the product of the load per car and the car miles per day, is the average number of net ton-miles per car per day. This average almost equaled the record in October, 1924, when it reached 551 ton-miles per car-day. The corresponding average for the first 10 months of 1924 was 471 net ton-miles, compared with 517 during the same period in 1923, and 498 for the year 1920.

Still other efficiency factors are the average freight trainload and the average number of cars per freight train. The month of October saw both of these averages raised to new high levels. The average trainload in October was 770 tons, compared with 722 tons in October, 1923. For the first 10 months, the corresponding averages were 715 tons in 1924, 719 tons in the same period of 1923, and 708 tons for the year 1920.

Freight cars per freight train averaged 43.8 in October, which was a record, the corresponding average in 1923 being 41.3 cars. For the 10 months to October 31, the average was 41.7 cars per train in 1924, 39.8 cars in 1923, and 36.6 cars for the year 1920.

New Facilities

The railways announced in November that their capital program for 1924, so far as authorized up to October 1, was \$1,077,000,000. Later returns indicated that the complete program for the year probably exceeded \$1,100,000,000, which is close to the corresponding capital program of the year 1923, approximately \$1,400,000,000.

The actual expenditures for capital improvements during 1924 were between \$800,000,000 and \$900,000,000. This is somewhat less than the expenditure of \$1,059,000,000 in 1923.

The capital program for 1924 was planned on a larger scale for extensions of tracks, yard improvements, and additions to other facilities than in 1923, and on a smaller scale for new equipment. In fact, the record as to units of new locomotives and freight cars installed was considerably lower than in 1923, and even than in several preceding years. According to special reports made to the Car Service Division of the American Railway Association, the railways of Class I in 1924 installed 2100 new locomotives, 158,000 new freight train cars, and 2700 new passenger train cars. At the close of the year, there were on order approximately 300 locomotives and 45,000 freight cars.

Compared with 1923, the locomotive installations in 1924 were slightly more than one-half. The installations of new freight train cars were approximately 80 per cent, while the installations of new passenger train cars were about the same. The carry-overs from 1924 into 1925—that is, the number on order at the close of the year—were smaller than the corresponding carry-overs from 1923 into 1924, so far as locomotives were concerned, in the relation of about 3 to 5; as to freight cars, there was a larger carry-over into the present year than into the year 1924. Here the relation was almost in the ratio of 3 to 5, but in the opposite direction.

The proportion of equipment in serviceable condition declined somewhat during the year 1924. This resulted in part from the fact that the railways during the whole of the year had a large surplus of freight cars, as well as a considerable surplus reserve of locomotives.

Financial Results

The railways of Class I earned approximately \$5,970,000,000 of total operating revenues in 1924, compared with \$6,356,891,000 in 1923. This was a decrease of \$387,000,000, or 6 per cent, under the revenues of 1923, which were the greatest on record. The revenues for

1924 were also less than in 1920, but were greater than in any previous year except 1920 and 1923.

The operating expenses during 1924 approximated \$4,557,000,000, which was a reduction of \$387,000,000, or 8 per cent, under the \$4,943,928,000 of operating expenses in 1923. These expenditures were not only less than those of 1923, but also 1920 and 1921, which were the three largest years of operating expenses on record. The operating ratio, or percentage of operating expenses to revenues, fell to 76.30 per cent, the lowest since prewar days. This compares with 77.77 per cent in 1923.

The reduction of \$387,000,000 in operating expenses in 1924, under those of 1923, reflects in part the reduced freight and passenger traffic of the year, compared with the preceding year. It also reflects the increased economy and efficiency with which the railways in 1924 conducted their transportation operations.

Railway taxes again broke all records. They approximated \$345,000,000 in 1924, which was an increase of 3 per cent over the corresponding total for 1923, which was \$336,000,000. Having for the first time exceeded \$300,000,000 in 1922, taxes have now gone nearly half the distance toward \$400,000,000, and show no sign of any reduction in the near future.

For the third year in succession, taxes assessed against the railways have exceeded the cash dividends paid by them, the excess of \$4,000,000 in 1924 being considerably greater than in any previous year. The significance of this showing is emphasized by the fact that 10 years ago, in 1914, railway cash dividends were more than $2\frac{1}{2}$ times as great as the taxes, while taxes now exceed the dividends. During the 10 years aggregate dividends declined 20 per cent; taxes increased 150 per cent. This steady upward trend of railway taxation continues to be one of the disquieting elements in the problem of

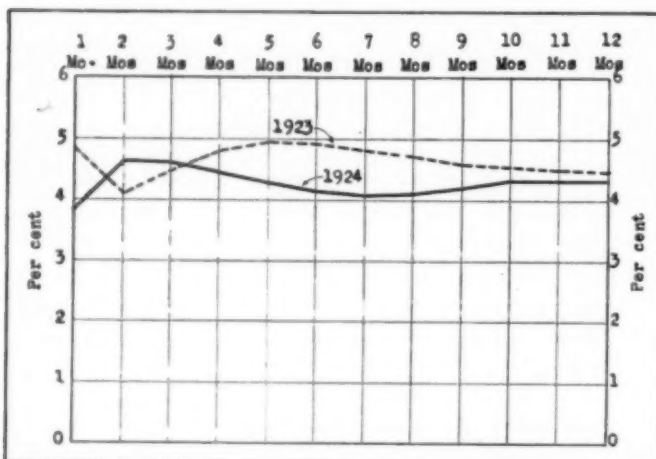


Chart A—Cumulative Rate of Return on Investment, 1923 and 1924

economical railway operation, and has a decided effect on the amount left for net operating income.

The net operating income for 1924, which is the balance of operating revenues, after operating expenses, taxes, and net rentals for equipment and joint facilities have been met, was approximately \$975,000,000, which is slightly less than the corresponding total for 1923. The fact that the railways were able to earn virtually as great a net income in 1924 as in 1923, on the basis of a somewhat smaller freight and passenger traffic, and in the face of a reduction of \$387,000 in total revenues, is another indication of the economy with which they conducted their operations in 1924.

The rate of return earned by the railways in 1924,

computed on the basis of their investment in road and equipment at the beginning of the year, including materials and supplies and cash, was 4.30 per cent. This compares with 4.47 per cent in 1923, 3.64 per cent in 1922, and 2.91 per cent in 1921. In other words, although the percentage earned during the past year was lower than in 1923, it was higher than in any previous year since the passage of the Transportation Act of 1920. At no time since the act went into effect, however, have the railways earned as much as $4\frac{1}{2}$ per cent on their investment, to say nothing of the $5\frac{3}{4}$ per cent which they are entitled to earn under the recapture clause of the Transportation Act.

TABLE I

	1924	1923
Total operating revenues.....	\$5,970,000,000	\$6,356,891,000
Total operating expenses.....	4,557,000,000	4,943,928,000
Taxes	345,000,000	336,382,000
Net operating income.....	975,000,000	977,657,000
Operating ratio	76.30%	77.77%

Table I presents in tabular form the financial statistics which have just been described. This table, as well as the others, applies to railways of Class I. All the statistics for the year 1924 are necessarily estimated in part, because this article is written before the close of the year. The figures are therefore subject to some revision when final returns for the year are tabulated.

Operating Revenues

The total operating revenues of railways of Class I in 1924, amounting to \$5,970,000,000, were less than in 1923 by 6 per cent. The freight and passenger rates in 1924 were practically on the same level as in 1923, only slight adjustments having been made in rates applying to certain commodities within restricted territories. For this reason, the reduction in total revenues reflects the reduced freight and passenger traffic of 1924, compared with the previous year.

The freight revenue for the year 1924 amounted to \$4,330,000,000, compared with \$4,624,399,000 in 1923. This was a reduction of 6 per cent.

The passenger revenue amounted to \$1,075,000,000, compared with \$1,147,752,000 for 1923, a reduction of nearly 7 per cent. These totals include the amounts received by the railways in the form of a surcharge on sleeping and parlor car tickets, which aggregated \$37,489,000 in 1923, and approximately the same amount in 1924.

Revenues received for the carriage of mail increased about 2 per cent; express revenue showed a smaller relative decline than freight or passenger revenue; "all other" revenue declined about 4 per cent.

TABLE II

	1924 (millions)	1923 (millions)
Freight revenue	\$4,330	\$4,624
Passenger revenue	1,075	1,148
Mail revenue	95	93
Express revenue	145	153
All other revenue.....	325	339
Total	\$5,970	\$6,357

The Table II the revenues in detail for 1924 are compared with those for 1923.

Operating Expenses

Total operating expenses in 1924 aggregated \$4,557,000,000, compared with \$4,943,928,000 in 1923. This was a reduction of 8 per cent.

Compared with 1920, the operating expenses of 1924 show the astonishing reduction of \$1,272,000,000. This reduction in cost of operation in 1924 is a striking example of the extent to which the railways during the past four years have done their bit toward reducing the cost of living of the American people. That this is no idle statement can be proven by definite statistics; for in 1924 the freight and passenger rates were sufficiently lower

than in 1921 to represent an aggregate saving of \$620,000,000 to shippers of freight and a saving of nearly \$50,000,000 to passengers, or a total of \$670,000,000. That is, had the freight and passenger rates in 1924 been at the level of the rates of 1921, instead of 13 and 4 per cent lower, respectively, the total charges made for transportation by the railways in 1924, on the traffic actually handled in that year, would have been \$670,000,000 greater than they were. A considerable portion of the reduced cost of railway operation has thus been passed along to the public in the form of reduced rates.

Total compensation to employees was less in 1924 than in 1923 by \$200,000,000, while the average number of employees in service throughout the year was also less.

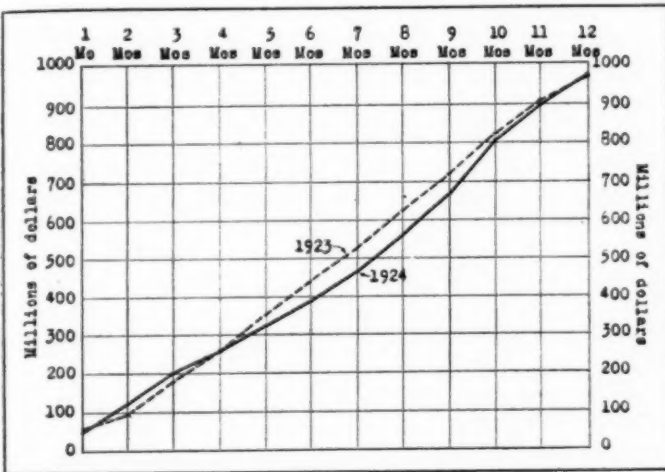


Chart B—Cumulative Net Operating Income, 1923 and 1924

In spite of the fact that certain large classes of employees, more particularly the trainmen, received increases during the latter part of 1922 and also during 1923, the average annual compensation per employee was slightly lower in 1924 than in 1923, reflecting a smaller number of hours—particularly overtime—during 1924. The full effect of some of the recent wage increases were felt in 1924, while others will not become fully effective until 1925, because they were in force during only a part of the year 1924.

Prices of many of the materials which the railways purchase in large quantities were lower in 1924 than in 1923. This was true of coal, where the cost to the railways (including handling charges) was \$3.08 per ton during the first 10 months of 1924, compared with \$3.50 during the same period of 1923. Some of the other materials utilized in large amounts, such as steel rail, other iron and steel products, and lumber, showed a general tendency either to decline in price or to remain practically without change.

Assisted to an extent by reductions in some of their material prices, the railways made good progress toward a reduction in the unit costs of operation. During the first nine months of 1924, for example, the selected train service unit costs averaged \$1,020 per 1,000 gross ton-miles in the freight service, compared with \$1,161 during the same months of 1923; the corresponding items of passenger train costs averaged 86.6 cents per passenger car-mile in the same period of 1924, compared with 94.7 cents for 1923.

Table III contains the various items of operating expense for 1924, compared with 1923. It will be noted that every item, except the two comparatively small traffic and general expense accounts, showed considerable reductions. As against a decrease of 8 per cent in total operating expenses, the expenditures for maintenance of way and structures declined 1½ per cent, expenditures

for maintenance of equipment decreased 13 per cent, while the decrease in transportation expenses was about 8 per cent. There were increases of 3½ per cent in traffic expenses and 3 per cent in general expenses, while the miscellaneous group known as "all other" declined 6 per cent. The reduction of 8 per cent in transportation expenses was somewhat greater than the reduction in the freight and passenger traffic, which shows that the railways conducted their transportation service at a somewhat lower cost during the year than in 1923.

TABLE III

	1924 (millions)	1923 (millions)
Maintenance of way and structures.....	\$809	\$822
Maintenance of equipment.....	1,279	1,475
Traffic	98	94
Transportation	2,166	2,351
General	168	163
All other	37	39
Total	\$4,557	\$4,944

Net Operating Income

The net operating income for 1924 was \$975,000,000, which was a slight decrease of \$2,000,000 under the total for 1923. While this decrease was to be expected, in the light of the reduced traffic of 1924, the fact that the decrease was so slight is another indication, among the many that stand out in the year's record, that the railways are attaining the level of efficient and economical management demanded of them by the public through the Transportation Act. Yet it was disappointing that they did not find it possible to approach somewhat closer to their goal of 5¼ per cent, also laid down in the Transportation Act. When computed on the basis of the investment in road and equipment, plus materials and supplies and cash, this net operating income for 1924 represented a rate of return of 4.30 per cent.

In fact, the net operating income in 1924 was less than in the calendar year 1916, when for the only time in railway history it exceeded a billion dollars. Since 1916, the railways have invested more than four billions net in their properties, yet their net operating income in 1924 was actually less than it was in 1916, leaving no margin whatever for a return on the heavy investments made during the past eight years.

Table IV indicates how the rate of return on investment was culminated during the year:

TABLE IV

	Rate of return, per cent (annual basis)
1924	
1 Month	3.80
2 Months	4.62
3 Months	4.62
4 Months	4.46
5 Months	4.27
6 Months	4.13
7 Months	4.07
8 Months	4.09
9 Months	4.21
10 Months	4.31
11 Months	4.33
12 Months	4.30

Chart A gives the cumulative record of rate of return on investment, for each successive monthly period of 1924, compared with 1923. Chart B is a similar cumulative showing of the aggregate net operating income for the two years.

Railway Traffic in 1924

The general figures as to railway traffic in 1924 have already been referred to. The summarized statistics are brought together in Table V, where they are shown for the three years 1922, 1923, and 1924, in terms of the number of revenue cars loaded, net ton-miles, and revenue passenger-miles. The year 1920, which was the record year for freight up to 1923, and still remains as

the record year for passenger traffic, is also inserted in the table as a matter of comparative interest.

TABLE V
Car Loadings

1924	48,500,000
1923	49,807,000
1922	43,208,000
1920	45,118,000

1924	430,000,000,000
1923	456,238,000,000
1922	371,946,000,000
1920	447,278,000,000

1924	36,400,000,000
1923	37,957,000,000
1922	35,470,000,000
1920	46,849,000,000

The railway freight traffic of the year 1924, when measured in terms of number of revenue cars loaded (carloadings), was the second heaviest on record, being exceeded only by 1923. In terms of net ton-miles, however, the year 1924 was surpassed by 1923, 1920, and 1918.

The total carloadings during the year were approximately 48,500,000, which was nearly three per cent below the high level attained in 1923. Measured in net ton-miles, the freight traffic of 1924 approximated 430 billion, which was six per cent less than in 1923. These aggregates, as in the case of the other statistics in this summary, are necessarily estimated in part, but it is not believed that any of the statistics will be subject to serious revision.

Curiously enough, carloadings in 1924 were greater than in 1920, while the net ton-miles for 1924 were less

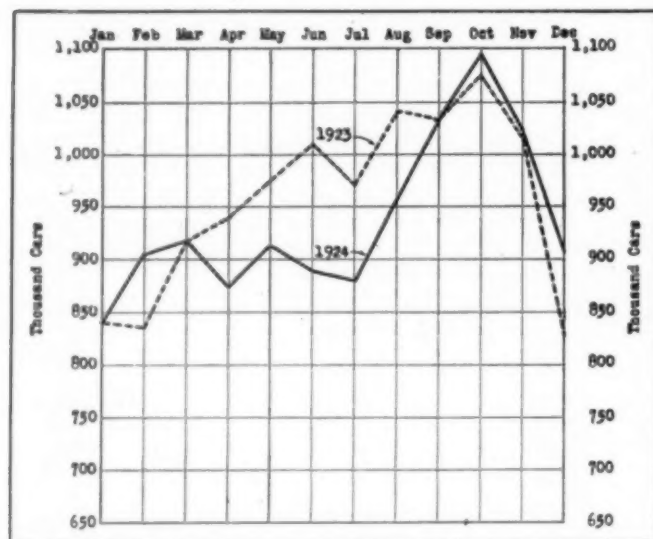


Chart C—Average Weekly Car Loadings—All Commodities, 1923 and 1924

than in 1920. This seeming anomaly grows out of the fact that the average load per car was somewhat less in the later year, declining from 29.3 tons in 1920 to 26.9 tons in 1924. As already indicated, this decline was due to the larger proportion of merchandise loadings in 1924, combined with a smaller proportion of coal and ore loadings.

Chart C shows the average weekly carloadings for each month of 1923 and 1924. It will be seen that the curve for 1924 was above that for 1923 in the first and fourth quarters of the year, but below during the second and third quarters.

Corresponding to the decline in net ton-miles, compared with 1923, there was a decrease during 1924 of four per

cent in revenue passenger-miles. This decline in passenger traffic was disappointing, inasmuch as there had been a slight increase in 1923 over 1922, and it had been hoped that the increase might continue in 1924. As the year developed, however, the railways lost the slight increase which they experienced in 1923, and fell back to a point about midway between 1922 and 1923.

The passenger traffic in 1924 was subjected to even more serious competition than in previous years from the rapidly growing number of passenger automobiles. In fact, the problem of a coordination of passenger transportation in the United States as between the railways, the increasing number of motor bus lines, and the fast growing number of private passenger automobiles, has come to

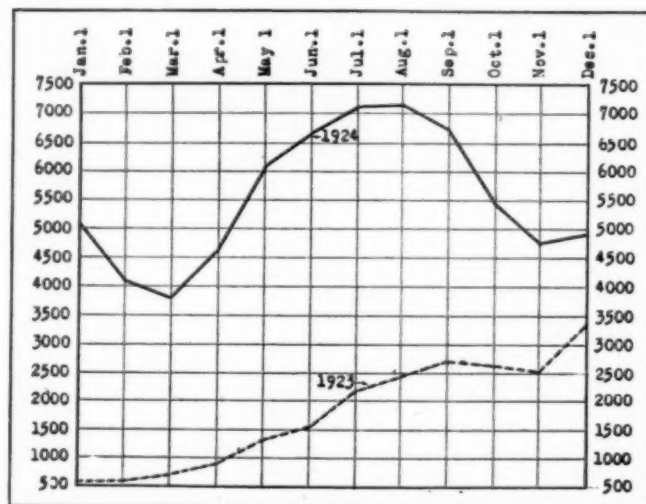


Chart D—Stored Locomotives, 1923 and 1924

the front as one of the outstanding problems for solution during the next few years.

In this connection, it may be recalled that the number of registered automobiles in the United States now exceeds 15 million, or one for every other family in the country.

The American people will have their passenger transportation in the form in which they want it. Although long distance automobile travel is frequently more expensive than travel by rail, even when the latter is undertaken with the most luxurious conditions and environment, yet the pleasure of traveling as a free agent in an individual unit of transportation seems to outweigh, in the minds of many, the comfort, speed, and convenience of travel by passenger train.

The fact that the form of transportation is not a question of cost with many motorists is indicated by the statistics which show that the amount of travel in Pullman cars has been increasing, whereas the aggregate of travel in day coaches continues to decrease.

Commodity Movements

The carloadings as a whole showed a decrease amounting to two per cent, but the movements of individual commodity groups showed a widely varying tendency as compared with the year 1923.

TABLE VI

Per Cent of Increase or Decrease, 1924 vs. 1923	
Grain and grain products.....	Inc. 11.8
Live stock.....	Dec. 1.0
Coal and coke.....	Dec. 12.2
Forest products.....	Dec. 2.7
Ore.....	Dec. 23.1
Merchandise, etc.....	Inc. 1.2
Total.....	Dec. 2.6

Table VI indicates the percentages by which the carload-

ings of the various commodity groups for the year 1924 were greater or less than the corresponding figures for 1923. These percentages are based on loadings for 50 weeks of the year, from January 1 to December 13.

The considerable declines of 12.2 per cent in the loadings of coal and coke, and 23.1 per cent in ore loadings, were the factors that pulled the total loadings for the year 1924 below those for 1923. Had there not been these declines, the freight traffic of 1924 would have passed into history as the greatest on record. The other commodity groups combined, representing about three-fourths of the total carloadings, increased 1.6 per cent over 1923.

Of the several general commodity groups, grain and

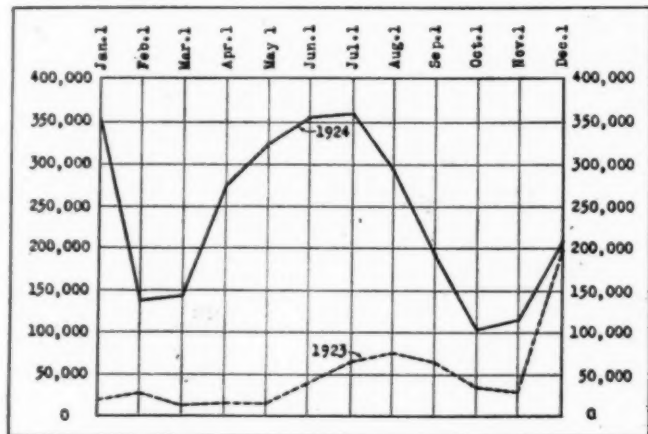


Chart E—Car Surplus, 1923 and 1924

grain products made the best showing, with an increase of 11.8 per cent over 1923. The total loadings of this class of agricultural products, amounting to about 2,570,000 cars, was a record movement, surpassing the previous high mark of 1922 by 120,000 cars.

Merchandise loadings, which include general manufactures, L. C. L., and miscellaneous products, and comprise three-fifths of the total loadings, increased 1.2 per cent, and set a record. The progressive tendency of this large general class of commodities to set new high levels, and also to attain to larger proportions of the total freight traffic, has been one of the remarkable features of railway operation during the past two years. In 1920 the loadings of this class were 25,524,000 cars, or 56.6 per cent of the total; in 1923, the loadings increased to 29,423,000 cars, and the percentage of the total to 59.2 per cent; in 1924, the new high figures were 29,800,000 cars and 61.2 per cent.

Receipts per Traffic Unit

The average receipts per ton-mile were approximately 1.12 cents in 1924, which was slightly higher than the corresponding average for 1923, although 13 per cent lower than the corresponding figure for 1921. The slightly increased average of receipts per ton-mile in 1924 does not indicate any increase in the level of freight rates, but merely emphasizes the fact that a larger proportion of manufactured and other high grade products was moving in 1924, and a smaller percentage of low grade commodities like coal, ore and grain.

Average receipts per passenger-mile were 2.96 cents in 1924, which was 1.3 per cent lower than in 1923, and 4 per cent lower than in 1921.

Employees and Their Wages

The total number of employees in 1924 averaged 1,775,000, which was less than the average number in 1923 by 105,000, or about 5½ per cent. The aggregate

compensation paid to all employees in 1924 was \$2,840,000,000, as against \$3,043,000,000 in 1923.

Compared with 1920, the later year makes an excellent showing. In 1920, the average number of employees on the payrolls of railways of Class I was 2,054,000, while in 1924 the same railways, handling, it is true, a somewhat smaller freight and passenger traffic, employed only 1,775,000 men. This reduction of nearly 280,000 men, at a time when traffic was being handled in a most efficient way, and when maintenance was probably as well looked after as in 1920, indicates a high grade of railway performance, for which the men as well as the managements deserve the fullest credit.

In 1924 there was some tendency for the wage rates to rise. This was particularly the case with certain classes of railway trainmen. Without going into detail, it is sufficient to point out that the average railway employee in 1924 worked a smaller number of hours than in 1923, but received a somewhat higher rate per hour. The average compensation per hour for the first 10 months of the year was 62.5 cents in 1923 and 63.9 cents in 1924. The hours worked per man, however, declined, the decrease being much greater in the case of overtime than of regular hours. When this fact is taken into account, the standard wage rates per hour appear to have increased to a greater extent than the average wages received per hour. The product of the two factors, namely, the number of hours per man multiplied by the average compensation per hour, was respectively \$1,619 in 1923 and \$1,600 in 1924. This is the average compensation per employee in the two years.

Fewer overtime hours mean more economical and efficient operation; many employees do not care to work

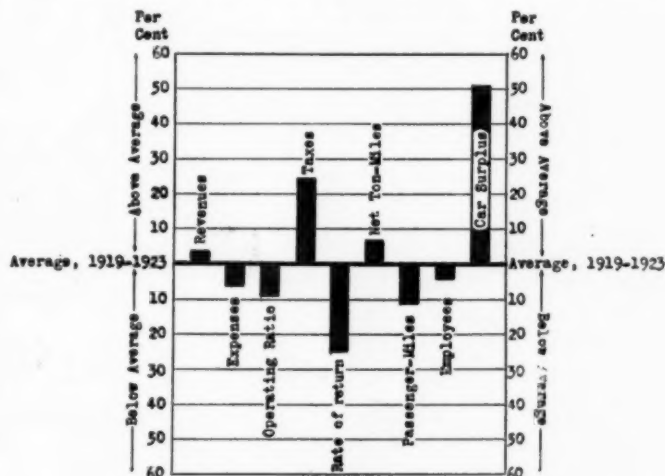


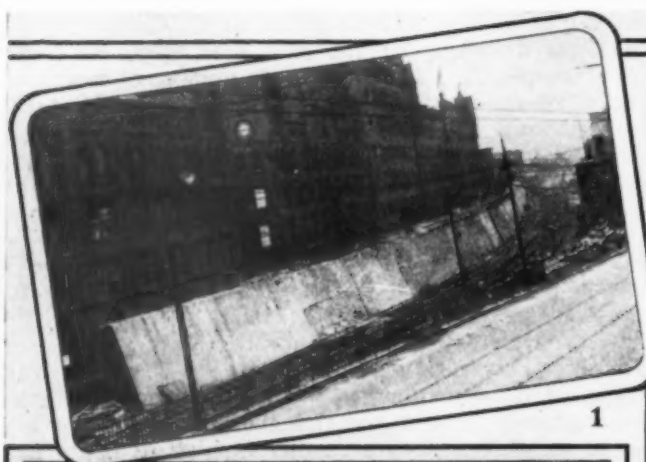
Chart F—Comparison of 1924 with Five-Year Average

steadily overtime, even at punitive or higher than regular rates per hour. In reducing the amount of overtime work, the railways in 1924 made some contribution toward the stabilization of railway employment.

TABLE VII

	1924	1923
January	1,749,927	1,779,516
February	1,753,289	1,783,555
March	1,760,269	1,816,479
April	1,787,217	1,843,652
May	1,792,504	1,896,219
June	1,770,565	1,933,929
July	1,773,114	1,954,687
August	1,788,972	1,973,505
September	1,801,296	1,945,917
October	1,822,616	1,936,494
November		1,899,545
December		1,793,779

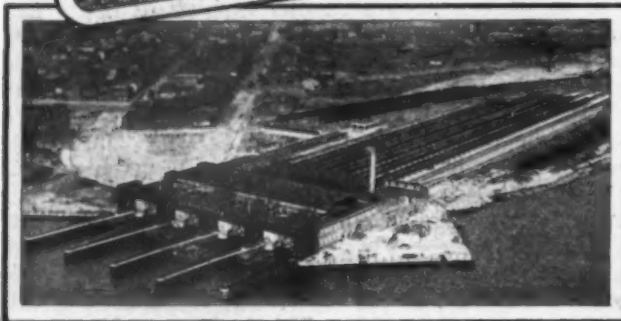
Table VII shows the number of employees reported for each month of 1924, so far as summarized to the
(Continued on page 67)



1



2



3



4



5



6



7

Some Typical Construction Projects of 1924—Nos. 1 and 2. Pennsylvania Grade Separation and Four-Tracking at Pittsburgh. 3. The Camden Terminal of the Reading. 4. Southern Pacific's Second Track in the Sierras. 5. The Castleton Cut-Off of the New York Central. 6. The Birmingham Shops of the Southern. 7. The New York Central's Castleton Bridge.



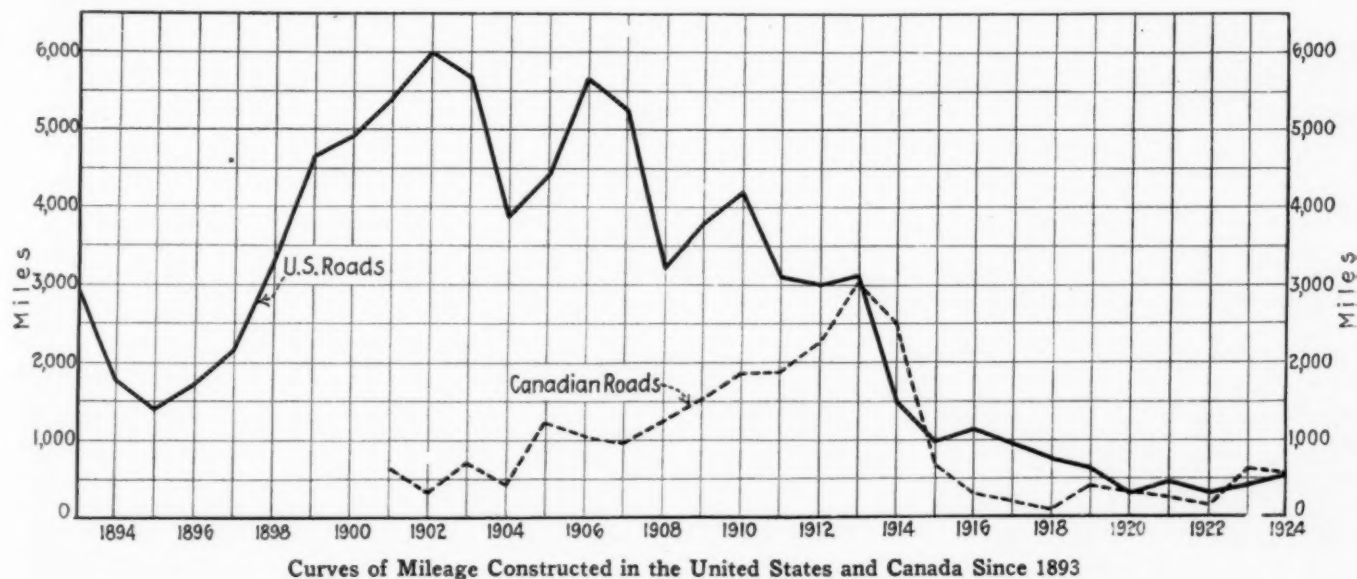
Illinois Central Constructs Alternate Line in Western Kentucky

Construction Activities in 1924

*Tendency to improve facilities which have a direct effect
on operating economies*

RAILWAY construction, which was resumed actively in 1923 following the protracted slump in work of this nature during and for about two years after the war period, continued in generous measure during 1924. The work was confined largely to those proj-

separation, and additional main track and similar projects. The construction of new lines or extensions to existing lines received some increased attention, the greater part of such work, however, being confined to a few sections of the country. Canadian construction like-



ects which had a direct relation to operation and which would permit of the increased use of equipment. It included improvements in facilities, such as shops, enlarged and new yards and terminals, bridge renewals or replacements to carry heavier power, grade reduction and grade

wise continued active during the past year. The abandonment of mileage was greater in 1924 than in 1923, but remained considerably below that of 1919 and 1918 which were apparently the peak years in this respect.

The amount of first track which was completed during

the year in the United States was somewhat greater than that for recent years, reaching a total of 578.95 miles, as compared with 427.27 for 1923 and 324.09 for 1922. It remained, however, considerably below the levels for the years preceding 1916 when from two to ten times as great a new mileage was put into service. Canadian first track totalled 614.50 miles in 1924 as compared with

1,176.07 for that year. The totals in both of these years were about three times the totals for the previous three years. The amounts for the individual classes of track were: first track, 578.95 miles, second, 456.12 miles, third, 51.22 miles, and fourth and other main track, 25.88 miles. The figures for second track for 1923, 1922, 1921 and 1920 were respectively, 684, 196, 143 and 91 miles.

In view of the fact that the new mileage for 1924 was greater than in any year since 1919, it is interesting to note how it was distributed. Of the 578.95 miles built, 258.3 miles were constructed and put into operation in the state of Florida and three-fourths of the remainder was built in approximately six other states. Of the 258.3 miles in Florida, 204 miles were built by the Florida Western & Northern, and the remainder by the Florida East Coast and the Ft. Myers Southern. This new line of the Florida Western & Northern, in connection with the existing lines of the Seaboard Air Line, gives a fairly direct cross-state route from West Palm Beach to Tampa. It opens up a large territory heretofore practically without rail transportation, and of which much is suitable for citrus fruits and truck farming. In addition to the completed 204 miles, this road has under construction two cut-offs, one to serve as a link to the Seaboard's through line to the north and the other to shorten the distance between Tampa and West Palm Beach. The two projects total 27 miles.

The "first track" projects in the other states are of a much smaller nature, the largest amount being 41.46 miles

MILES OF NEW LINE COMPLETED IN THE UNITED STATES SINCE 1893			
1893.....	3,024	1909.....	3,748
1894.....	1,760	1910.....	4,122
1895.....	1,420	1911.....	3,066
1896.....	1,692	1912.....	2,997
1897.....	2,109	1913.....	3,071
1898.....	3,265	1914.....	1,532
1899.....	4,569	1915.....	933
1900.....	4,894	1916.....	1,098
1901.....	5,368	1917.....	979
1902.....	6,026	1918.....	721
1903.....	5,652	1919.....	686
1904.....	3,832	1920.....	314
1905.....	4,388	1921.....	475
1906.....	5,623	1922.....	324
1907.....	5,212	1923.....	427
1908.....	3,214	1924.....	579

654.59 miles in 1923, the latter two years showing the largest new mileage in Canada since 1915.

The total miles of abandoned lines was 437.50 for track abandoned and taken up and 255.11 for track abandoned and not taken up, a total of 692.61 miles. The same figures for 1923 were 128.82 and 387.13, or a total of 515.95.

The total mileage of new line (first, second, third and other multiple main track) was approximately equal to that of 1923, being 1,113.77 miles as compared with

Lines Abandoned in the United States and Canada in 1924

United States		United States	
	Lines abandoned and taken up Miles		Lines abandoned and taken up Miles
Atlantic City Railroad—		Midland & Northwestern—	
At Kaighn's Point, Camden, N. J.....	1.05	In Texas.....	65.0
Baltimore & Ohio—		Minneapolis & St. Louis—	
Bedford, Ind., to Riverdale.....	9.33	Alaska, S. D., to Le Beau.....	12.51
Blytheville, Burdette & Mississippi—		Missouri Pacific—	
Burdette, Ark., to West Blytheville.....	7.0	Near Larned, Kans.....	0.13
Boston & Maine—		Muscataine, Burlington & Southern—	
Old Orchard Beach, Me., to Camp Ellis.....	3.83	Muscataine, La., to Burlington.....	53.8
Buffalo, Rochester & Pittsburgh—		New York, New Haven & Hartford—	
Eleanora Jct., Pa., to Big Run.....	1.12	Saybrook Jct., Conn., to Saybrook Point.....	1.52
Central Arizona—		East Farms, Conn., to Meriden.....	11.39
In Arizona.....	6.0	Pontiac, R. I., to Clyde.....	2.22
Central of New Jersey—		Norfolk & Western—	
At Middle Valley, N. J.....	1.4	On Crimora ore branch, Va.....	2.54
Chesapeake & Ohio—		Ocilla Southern—	
Near Raleigh, W. Va.....	0.78	Nashville, Ga., to Fitzgerald.....	39.1
Near Sovereign, W. Va.....	3.03	Pacific Electric—	
Chicago, Rock Island & Pacific—		In Pasadena, Cal.....	1.6
Willard, Kans., to Mayle Hill.....	2.01	Pelham & Havana—	
Guthrie, Okla., to Chandler.....	39.39	Cairo, Ga., to Havana, Fla.....	25.3
Coalgate, Okla., to Lehigh.....	4.94	Pere Marquette—	
Cimarron & Northwestern—		Benton Harbor, Mich., to Buchanan.....	22.5
Ponil Park, N. M., to South Ponil.....	14.0	Pennsylvania System—	
Cincinnati & Westwood—		Near Irvinia, Pa.....	0.43
Cincinnati, Ohio, to Westwood.....	5.5	Milton, Del., to Ellendale.....	8.74
Colorado & Southern—		At Bradford, Pa.....	1.5
Long's Jct., Colo., to end of track.....	0.57	Near Bushrod, Ind.....	2.92
Beshoar Jct., Colo., to Gray Creek mine.....	7.85	Portland Terminal—	
Denver & Rio Grande Western—		At Portland, Me.....	0.17
Leadville, Colo., to Dillon.....	36.18	Reading Company—	
Hecla Jct., Colo., to Calumet.....	7.13	Near Boiling Springs, Pa.....	0.71
Graneros, Colo., to Lascar.....	9.69	Rome & Northern—	
Escambia Railway—		West Rome, Ga., to Gore.....	17.6
Mons, Ala., to Hadley.....	23.0	Savannah & Southern—	
Ecanaba & Lake Superior—		In Georgia.....	32.0
In Michigan.....	3.51	Silverton Northern—	
Fulton Chain Railway—		Silverton, Colo., to Joker Tunnel.....	15.5
Fulton Chain, N. Y., to Old Forge.....	2.21	Stanley, Merrill & Phillips—	
Glenmora & Western—		Stanley, Wis., to Polley.....	15.0
Tuttle, La., to Lecompte.....	23.3	Statenville Railway—	
Illinois Central—		In Georgia.....	14.0
Clark, Ky., to Stiles.....	3.58	Upper Merion & Plymouth—	
Kalamazoo, Lake Shore & Chicago—		At Swedeland, Pa.....	0.1
Kalamazoo, Mich., to Lawton.....	16.69	Total.....	437.50
Kansas City Southern—			255.11
Braden, Okla., to Reynolds.....	2.67	Canada	
Keeseville, Ausable Chasm & Lake Champlain—		Canadian National—	
Keeseville, N. Y., to Port Kent.....	5.64	Donnacona, Que., to Cap Rouge.....	19.58
Lorain Railroad—		Hemmingford, Que., to International Boundary..	2.86
Pennsboro, W. Va., to Pullman.....	14.0	At Coburg, Ont.....	1.22
Los Angeles & Salt Lake—		Yelsum, Alta.....	0.14
Los Angeles, Cal., to East San Pedro.....	0.37	Yelsum, B. C., to Rainbow.....	18.46
Caliente, Nev., to Pioche.....	0.04	Temiskaming & Northern Ontario—	
Malvern & Freco Valley—		Between North Bay Jct., Ont., and Nipissing Jct.	2.0
In Arkansas.....	24.0	Vancouver, Victoria & Eastern Ry. & Nav. Co.—	
Manistee & Northeastern—		Kilgard, B. C., to Connor.....	7.42
Platte River, Mich., to Empire Jct.....	16.84	Total.....	51.68
Midland Railway—			
Savannah, Ga., to Statesboro.....	48.6		

for Kentucky, all constructed by the Illinois Central. This road also has under construction a 166-mile line to serve as a cut-off between Edgewood, Ill., and Fulton, Ky. The third state in the list was Oregon, with 33.83 miles, practically all of which was the work of the Oregon Short Line, a road which has been fairly active in construction of new first track for several years, and which has considerable additional work in progress. It now has a line under construction from Rogerson, Ida., to Wells, Nev., 95 miles, and two other units in Idaho of 27.78 miles and 2.66 miles in length. Some small amount of mileage was furnished by the completion of lines of new companies, examples of which are 16 miles between Smithsville, Miss., and Fulton of the Mississippian Railway and 26.5

National. Second track was 21.22 miles, all built by the Canadian National. This road also completed 4.35 miles of second track in the United States.

Construction other than track during the past year ran into a great number of projects and involved large expenditures of which a considerable amount will be carried over into 1925. Terminal improvements, both engine and freight, were made on most of the roads, although projects of this nature were not as numerous as they were in the previous year. The work of the eastern roads included a greater proportion of such projects as extensions and improvements to freight terminals, sidings and yards, the work of the western roads being more general in nature and including a wide variety of improvements.

NEW TRACK BUILT IN 1923						
United States	Number Companies building	Miles				Total
		First track	Second track	Third track	Fourth or more track	
Alaska	1	64.00	.....	.....	.....	64.00
Arizona	1	.....	89.49	.....	.....	89.49
California	4	84.22	111.85	.....	.....	196.05
Florida	2	10.00	4.00	.....	.....	14.00
Georgia	1	.....	23.00	.....	.....	23.00
Idaho	1	15.29	9.70	.....	.....	24.99
Illinois	10	5.82	60.97	11.92	5.19	83.90
Indiana	3	.....	21.89	0.24	0.06	22.19
Kansas	6	12.39	47.38	5.98	.....	65.75
Kentucky	4	2.50	33.08	2.39	.....	37.97
Louisiana	2	13.24	11.62	.....	.....	24.86
Maine	1	0.40	.....	.....	.....	0.40
Maryland	1	1.41	1.41	.....	.....	2.82
Michigan	5	37.15	33.72	.....	.....	70.87
Minnesota	3	32.46	7.41	.....	.....	39.81
Mississippi	1	9.00	.....	.....	.....	9.00
Montana	1	.....	18.98	.....	.....	18.98
Nevada	1	.....	29.14	.....	.....	29.14
New Jersey	2	0.87	1.03	1.61	.....	3.51
New Mexico	1	.....	31.23	.....	.....	31.23
New York	3	2.53	0.43	.....	10.46	13.42
North Dakota	1	.....	10.98	.....	.....	10.98
Ohio	5	5.08	23.09	13.37	1.15	42.69
Oklahoma	3	16.64	.....	.....	.....	16.64
Oregon	2	19.09	.....	.....	.....	19.09
Pennsylvania	5	8.43	15.06	6.22	6.22	35.93
South Carolina	1	.....	39.00	.....	.....	39.00
Tennessee	1	1.50	.....	.....	.....	1.50
Texas	3	7.34	0.33	.....	.....	7.67
Utah	4	43.23	11.41	.....	.....	54.64
Virginia	2	21.33	.....	.....	.....	21.33
Washington	1	3.00	.....	.....	.....	3.00
West Virginia	5	10.40	4.80	.....	.....	15.20
Wyoming	1	.....	43.01	.....	.....	43.01
Total	87	427.27	683.99	41.73	23.08	1,176.07
Canada	2	654.59	16.09	3.74	.....	674.42

NEW TRACK BUILT IN 1924						
United States	Number Companies building	Miles				Total
		First track	Second track	Third track	Fourth or more track	
Alabama	1	.....	3.40	.....	.....	3.40
Arizona	1	8.00	.....	.....	.....	8.00
California	7	6.90	55.18	.....	.....	62.17
Colorado	2	17.07	1.23	.....	.....	18.30
Florida	3	258.30	24.30	.....	.....	282.60
Georgia	1	2.61	.....	.....	.....	2.61
Illinois	2	2.75	39.83	16.00	4.96	63.54
Indiana	1	.....	7.36	.....	.....	7.36
Kansas	2	7.28	10.75	.....	.....	18.03
Kentucky	3	41.46	47.55	.....	.....	89.01
Michigan	6	16.81	26.49	.....	.....	43.30
Minnesota	1	.....	0.50	.....	.....	0.50
Mississippi	1	16.00	.....	.....	.....	16.00
Missouri	1	.....	9.31	.....	.....	9.31
Montana	2	30.75	21.04	.....	.....	51.79
Nevada	1	.....	7.07	.....	.....	7.07
New Jersey	2	0.73	0.73	10.00	10.00	21.46
New Mexico	1	.....	59.95	.....	.....	59.95
New York	4	21.60	15.54	1.06	6.94	45.14
North Carolina	1	.....	32.44	.....	.....	32.44
Ohio	8	15.15	46.49	3.94	3.94	69.52
Oklahoma	2	23.93	.....	.....	.....	23.93
Oregon	2	33.83	.....	.....	.....	33.83
Pennsylvania	3	2.22	6.93	.....	1.64	10.79
South Carolina	1	.....	33.37	.....	.....	33.37
Tennessee	1	.....	1.55	.....	.....	1.55
Utah	1	6.20	.....	.....	.....	6.20
Virginia	1	1.77	.....	.....	.....	1.77
Washington	1	26.50	.....	.....	.....	26.50
West Virginia	4	2.25	6.66	20.22	.....	29.13
Wyoming	1	35.20	.....	.....	.....	35.20
Total	67	578.95	456.12	51.22	25.88	1,113.77
Canada	6	614.50	21.22	.....	.....	635.72

miles between Longview, Wash., and Ryderwood of the Longview, Portland & Northern.

The construction of second track was likewise confined to a relatively few states with the major portion of it built by a small number of the larger systems. There were no outstanding large units built by any one road which compared with the 202 miles of the Atchison, Topeka & Santa Fe during 1923, although this road completed 103.92 miles in New Mexico and California, the largest amount completed by any one road during the year just passed. The nearest approach to this figure was 68.42 miles for the Atlantic Coast Line in the states of North Carolina, South Carolina and Georgia. Other roads which built considerable second and other main track were the Illinois Central, the Florida East Coast, the Pennsylvania and the New York Central. By states, the largest mileage of second track was in New Mexico, followed by California, Kentucky and Ohio in the order named.

Canadian mileage of first track totalled 614.50. Of the first track mileage, 409.8 miles were built and put into operation by the Canadian Pacific in the province of Saskatchewan and represents largely the completion of a number of branch line extensions which this road has had under way for a number of years. There still remains a considerable amount of first track to be completed in Canada, both by the Canadian Pacific and the Canadian

Grade separation along with some grade and line revision received increased attention during 1924, some of the roads expending large sums for this class of work. The most outstanding program of this nature was that of the Illinois Central with work totalling over \$15,000,000 and involving changes at Chicago, Riverdale, Harvey and Champaign in Illinois, and at Central, Ky., and Jackson, Miss.

Bridge renewals and bridge strengthening were carried forward on a large scale by many roads and in conjunction with the grade separation projects formed a large proportion of the year's work. Among the individual projects the Castleton cut-off of the New York Central has been the largest undertaken by the railroads during recent years. This work is now practically completed, the bridge across the Hudson river, the yard and engine terminal and all of the double-track connections with the exception of the one leading to the Hudson division of the New York Central having been put into operation.

The abandonment of uneconomic lines still continued in 1924, and so far as mileage abandoned and taken up was concerned, increased considerably over the figures for 1923, being 437.50 miles for 1924 and 128.82 miles for 1923. The figures for miles abandoned and not taken up declined from 384.13 in 1923 to 255.11 in 1924, a figure far below that of the previous years. Much of the increase in mileage taken up can doubtlessly be attributed to a better realization of the economic position of many of the small roads and the branch lines of the larger

roads as well, and of the impossibility of securing sufficient traffic to make them pay even the operating expenses. Thus, instead of attempts to sell them as possible operating units, or as roads which might be rehabilitated and operated profitably, there has resulted the absolute junking of the roads in order to liquidate the property and secure such value from it as there may remain. It is interesting to note that the junking of lines involving more than a few miles was not all on the part of the small short lines for some of the large railroads apparently found it of advantage to get rid of unprofitable branch lines or parts of branch lines varying in length up to 40 miles. Typical of this was the abandonment of approximately 52 miles by the Denver & Rio Grande Western in Colorado, about 46 miles by the Chicago, Rock Island & Pacific, chiefly in Oklahoma, 22 miles by the Pere Marquette in Michigan and 15 miles by the New York, New Haven & Hartford, chiefly in the state of Connecticut.

It is doubtful whether any of the mileage which was

abandoned during the last year was because of, or the indirect result of, the competition of outside agencies such as the motor trucks and the motor buses. There is no doubt, however, that such competition will have a considerable effect upon railway mileage abandonment in the future, particularly in the more congested areas. This has already been evidenced by the proposals of the Boston & Maine, in which this road plans the abandonment of approximately 1,000 miles of branch lines and the substitution of motor service where feasible for the steam service formerly rendered. This is one of the results of motor bus competition in New England, which this road now expects to meet by giving a similar type of service, to be handled by a subsidiary called the Boston & Maine Transportation Company. While this plan has been made public but recently (*Railway Age*, December 27, 1924), applications before the Interstate Commerce Commission to abandon mileage already total about 150 miles and are, in a way, indicative of what may be expected from other roads, now or likely to be faced with the same problem.

Railway Construction in the United States in 1924

Alabama & Vicksburg

Important Work Undertaken: Joint track elevation in connection with the Illinois Central at Jackson, Miss., cost \$250,000 (15 per cent completed).

Atchison, Topeka & Santa Fe

Second Track: Horace, N. M., to Baca, 24.3 miles. Suwanee, N. M., to McCartys, 35.65 miles. Hicks, Cal., to Summit, 43.97 miles.

Atlantic City Railroad

First Track: In Camden, N. J., 0.73 miles.
Second Track: In Camden, N. J., 0.73 miles.

Atlantic Coast Line

Second Track: Parkton, N. C., to South Carolina state line, 32.44 miles. Yemassee, S. C., to Coosawhatchie, 8.70 miles. From South Carolina state line to Pee Dee, S. C., 24.67 miles. From Telfair Junction, Ga., to Savannah, 2.61 miles.

Baltimore & Ohio

First Track: Millvale, Pa., to Etna, 1 mile.
Second Track: Brydon, W. Va., to Flemington, 4.9 miles. Bellaire, Ohio, to Bridgeport, 3.1 miles.
Important Work Undertaken: Electrification of Staten Island lines, cost \$2,185,000 (10 per cent completed). Track elevation, Princess Bay to Pleasant Plains, Staten Island, N. Y., cost \$1,050,000 (25 per cent completed). Additional ferry slip at Tottenville, Staten Island, cost \$124,300 (completed). Track elevation through South Philadelphia, initial appropriation \$1,000,000 (35 per cent completed). New grain elevator, pier and galleries at Baltimore, Md., cost \$5,500,000 (completed). New double-deck export pier at Baltimore, cost \$3,600,000 (completed). New office building at Mt. Clare shops, Baltimore, cost \$201,500 (completed). Bridge renewal at Baltimore, cost \$140,000 (completed). Bridge renewals, Mt. Crawford, Va., to Verona, cost \$311,000 (completed). Grade separation at Silver Springs, Md., cost \$170,000 (10 per cent completed). Grade separation at Cumberland, Md., cost \$270,000 (10 per cent completed). Relining tunnel at Kingsville, W. Va., cost \$112,000 (completed). New freight house and automobile platforms at Pittsburgh, Pa., cost \$100,000 (completed). Bridge renewal at Parkersburg, W. Va., cost \$476,000 (completed). Bridge renewal at Stewart, Ohio, cost \$285,000 (50 per cent completed). Bridge renewal at Guysville, Ohio, cost \$240,000 (50 per cent completed). Bridge renewal at Chillicothe, Ohio, cost \$215,000 (completed). Bridge renewal at Musselman, Ohio, cost \$117,000 (75 per cent completed). Bridge renewal at Cincinnati, Ohio, cost \$170,000 (completed). New yard and engine terminal at East St. Louis, Ill., cost \$254,000 (completed). Track elevation in Chicago, Ill., cost \$400,000 (completed).

Bessemer & Lake Erie

Important Work Undertaken: Widening channel and constructing new dock front at Conneaut Harbor, Ohio, cost \$916,600 (85 per cent completed). Building yard and eliminating grade crossing at Rural Ridge, Pa., cost \$219,800 (50 per cent completed). Change of line at Coolspring, Pa., cost \$360,000 (45 per cent). Building anchorages for dock front and rear runways at Conneaut Harbor, Ohio, cost \$205,000 (90 per cent completed).

Beaver Meade & Englewood

First Track: Forgan, Okla., to Turpin, 21 miles.
Important Work Undertaken: New road under construction from Turpin, Okla., to Hooker.

Birmingham Belt

Important Work Undertaken: New engine terminal at East Thomas, Birmingham, Ala., cost \$650,000 (completed).

Boston & Albany

Fourth Track: Niverville, N. Y., to Hudson River Connecting Railroad, 2.7 miles.
Important Work Undertaken: New baggage, mail and express building at Springfield, Mass., cost \$668,000 (completed).

Boston & Maine

Important Work Undertaken: New locomotive repair shop at Concord, N. H., cost \$300,000. Strengthening bridge at Gorham, N. H., cost \$117,000

(completed). Rebuilding three-track bridge at Cambridge, Mass., cost \$150,000 (completed).

Carolina & Northeastern

Important Work Undertaken: New line under survey from Lasker, N. C., to Ahoskie, 20 miles.

Central Arizona

First Track: In the state of Arizona, 8 miles.
Important Work Undertaken: New line under survey in Arizona, 10 miles. New road under construction from present line into new timber territory, 3 miles.

Central of Georgia

Important Work Undertaken: New viaduct, storage house and yard improvements at Columbus, Ga., cost \$630,000 (75 per cent completed). New coach repair shop at Savannah, Ga., cost \$330,000 (80 per cent completed). Grade revision of line from Columbus to Birmingham, cost \$4,500,000 (30 per cent completed).

Central of New Jersey

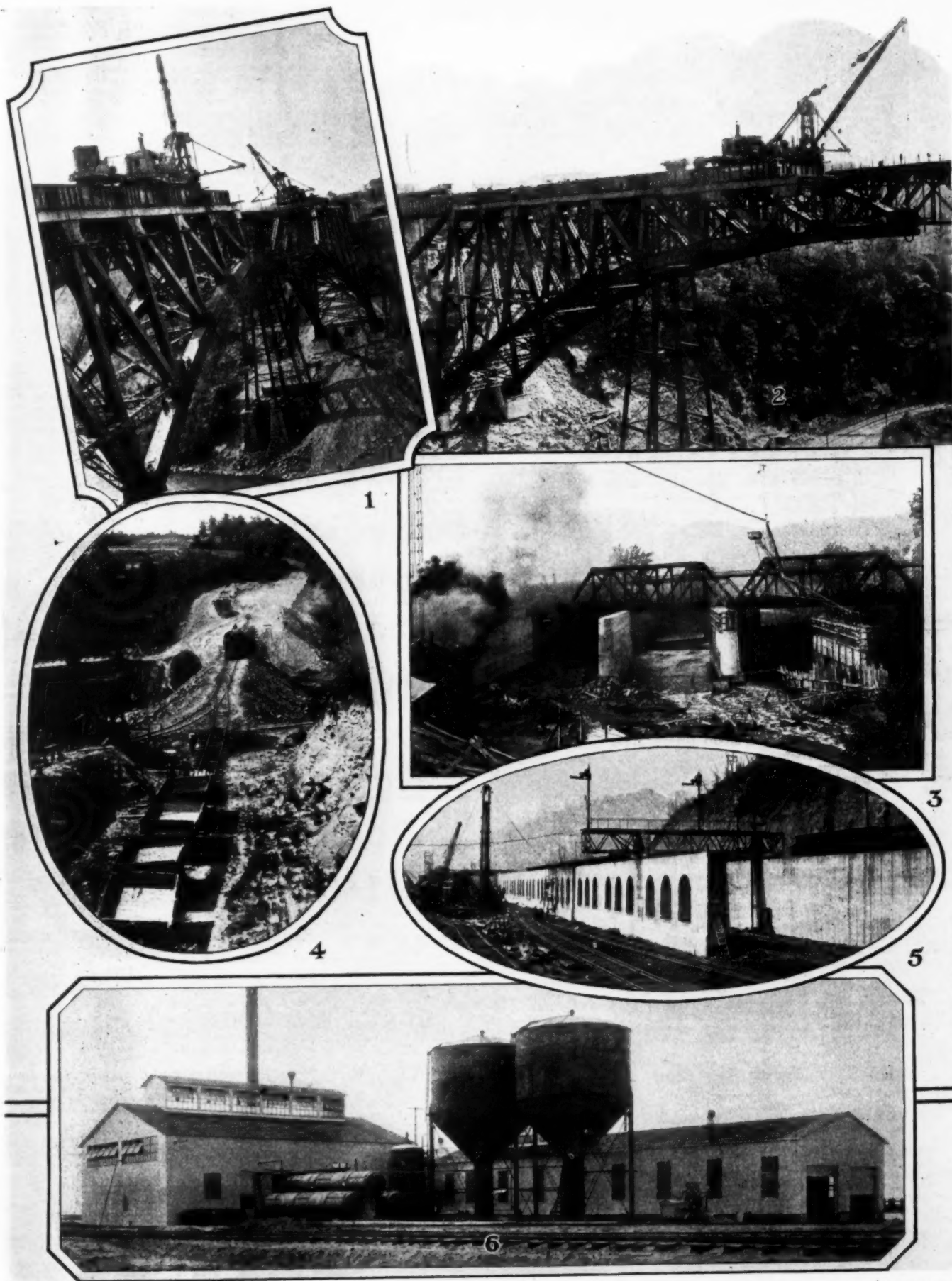
Important Work Undertaken: New bridge across Newark Bay, between Bayonne and Elizabethport, N. J., cost \$9,456,716 (40 per cent completed). Construction of west approach to Newark Bay bridge, cost \$1,601,830 (12 per cent completed). Elimination of grade crossings through Somerville, N. J., cost \$1,262,896 (40 per cent completed). New passenger terminal at Raritan, N. J., cost \$619,580 (60 per cent completed). Elimination of grade crossings at Perth Amboy, cost \$2,000,000 (12 per cent completed).

Chesapeake & Ohio

Second Track: Stollings, W. Va., to McConnell, 1.76 miles. Fergo, Ky., to Shelby, 3.00 miles. Buffalo Tunnel, Ky., to Auxier, 3.00 miles. Robbins, Ohio, to Gregg, 1.52 miles.
Important Work Undertaken: New freight station at Norfolk, Va., cost \$183,480 (completed). New storage yard at Newport News, Va., cost \$340,000 (completed). Extension of yard tracks at Fulton, Va., cost \$150,500 (completed). Reduction of grade at Covington, Va., cost \$468,000 (completed). Extension of sidings at various points, cost \$367,800 (completed). New yard and change in line at Huntington, W. Va., cost \$103,400 (completed). Additional yard tracks and turntable at Sproul, W. Va., cost \$145,100 (completed). Additional yard tracks at Peach Creek, W. Va., cost \$158,100 (completed). New machine shop at Peach Creek, cost \$109,600 (completed). Additional yard tracks at Taplin, W. Va., cost \$104,000 (completed). Additional yard tracks at Whitesville, W. Va., cost \$113,400 (completed). Additional tracks at westbound classification yard at Russell, Ky., cost \$425,000 (completed). Purchase of Camp Morrison from government and rehabilitation of buildings, cost \$147,000 (96 per cent completed). New freight terminal at Clifton Forge, Va., cost \$3,630,000 (87 per cent completed). New tracks at Quinimont, W. Va., cost \$138,700 (completed). Additional passing siding at Gauley, W. Va., cost \$215,000 (22 per cent completed). Building third track and other improvements at Russell, cost \$2,579,880 (71 per cent completed). Additional storage tracks at Ashland, Ky., cost \$134,300 (85 per cent completed). Construction of second track, Hampton, Ky., to Lockwood, cost \$416,000 (75 per cent completed). Bridge renewal from Dayton, Ky., to Bellevue, cost \$108,700 (completed). Strengthening bridges on Chicago division, cost \$107,000 (completed).

Chicago & North Western

First Track: From Proviso, Ill., to Elmhurst, 2.75 miles.
Third Track: From Elmhurst, Ill., to West Chicago, 16 miles.
Important Work Undertaken: New road under construction northerly from Turtle, Mich., 8 miles. Construction of subway and elevation of tracks at Ogden avenue, Chicago, Ill., cost \$373,690 (completed). Construction of subway under tracks at Clybourn station, Chicago, cost \$300,000 (completed). Mayfair track elevation work at Chicago, cost \$500,000 (completed). Building subway to carry Ogden avenue under tracks at Chicago, Ill., cost \$291,960 (25 per cent completed). Layton Park grade separation at Milwaukee, Wis., cost \$1,500,000 (completed). New concrete subway at Sterling, Ill., and rearrangement of freight and passenger station facilities, cost \$197,763 (completed). Installation of new boiler house facilities at Chicago shops, cost \$261,460 (completed). Reconstruction of ore dock No. 2 at Ashland, Wis., cost \$528,000 (completed). Grade reduction, Chadron to Valentine, Neb., cost \$290,000 (completed). Rebuilding wooden ore dock No. 6 at Escanaba, Mich., cost \$1,900,000 (5 per cent completed). New trackage to serve mines at Ramsay, Mich., cost \$114,256 (completed).



Some Typical Construction Projects of 1924—Nos. 1 and 2. The Niagara Arch of the Michigan Central. 3. The Chesapeake & Ohio's Work at Clifton Forge, Va. 4. The Illinois Central's Alternate Line in Kentucky. 5. A Jump-over Bridge of the Baltimore & Ohio at Pittsburgh. 6. The Santa Fe's Treating Plant at San Diego, Calif.

Chicago & Western Indiana

Important Work Undertaken: Construction of additional yard tracks at Clearing yard, Chicago, Ill., cost \$157,000 (70 per cent completed).

Chicago, Burlington & Quincy

Important Work Undertaken: Terminal improvements at Denver, Colo., cost \$300,000 (90 per cent completed). Building new line 18 miles in length from Vermont, Ill., to Frederick, cost \$2,500,000 (95 per cent completed). Passenger station facilities at various points, cost \$206,500 (completed). Water treating plants at various points, cost \$95,000 (completed). New steel car shops at Galesburg, Ill., cost \$230,000 (95 per cent completed). New ice house at Lincoln, Neb., cost \$125,000 (80 per cent completed). New subway to carry 18 tracks at Casper, Wyo., cost \$90,000 (completed). Reconstruction of bridge at Arvada, Wyo., cost \$97,600 (98 per cent completed). Reconstruction of bridge across Platte river near Oreapolis, Neb., cost \$326,753 (completed).

Chicago, Indianapolis & Louisville

Important Work Undertaken: Track elevation work at Indianapolis, Ind., cost \$500,000 (75 per cent completed).

Chicago, Rock Island & Pacific

First Track: Willard, Kans., to Maple Hill, 1.84 miles.
Second Track: Latimer, Kans., to Herington, 7.55 miles. Willard, Kans., to Maple Hill, 3.20 miles.
Important Work Undertaken: New line under survey from Ponca City, Okla., to Billings, 27.34 miles. Rebuilding bridge at DeValls Bluff, Ark., cost \$514,000 (40 per cent completed).

Cleveland, Cincinnati, Chicago & St. Louis

First Track: Mix, Ohio, to Spafford, 6.66 miles. Padgett, Ohio, to Jones, 3.41 miles.
Second Track: Mix, Ohio, to Lamp, 13.22 miles. Padgett, Ohio, to Jones, 3.41 miles.

Delaware, Lackawanna & Western

Third Track: Lincoln Park, N. J., to Boonton, 10 miles.
Fourth Track: Lincoln Park, N. J., to Boonton, 10 miles.

Denver & Rio Grande Western

Second Track: Minnequa, Colo., to Southern Junction, 1.23 miles.
Important Work Undertaken: Shop improvements at Burnham, Colo., cost \$998,068 (completed). Shop improvements at Salida, Colo., cost \$355,530 (completed). Shop improvements at Grand Junction, Colo., cost \$277,600 (completed). Shop improvements at Alamosa, Colo., cost \$172,840 (completed). Shop improvements at Salt Lake, Utah, cost \$1,229,095 (completed). Reconstruction of freight terminals at Denver, Colo., cost \$209,375 (completed).

Denver & Salt Lake

Important Work Undertaken: Construction of Moffat tunnel, cost \$6,200,000, work under way.

Detroit & Ironton

Second Track: Fordson, Mich., to Flat Rock, 13.64 miles.
Important Work Undertaken: New line projected from Durban, Mich., to Malinta, Ohio, 55.71 miles.

Detroit & Mackinac

First Track: Alpena, Mich., to Rockport, 14 miles.

Detroit & Toledo Shore Line

Important Work Undertaken: Additional yard tracks at Lang, Ohio, cost \$164,000 (75 per cent completed). Construction of 5 miles of additional second track from Wyandotte, Mich., to Slocum Junction, gading completed.

Detroit Terminal

First Track: In the State of Michigan, 1.81 miles.
Second Track: In the State of Michigan, 1.28 miles.

Detroit, Toledo & Ironton

Important Work Undertaken: Relocation of main line at Sibley, Mich., cost \$250,000 (95 per cent completed).

Elgin, Joliet & Eastern

Important Work Undertaken: New bridge over DuPage river at Plainfield, Ill., cost \$100,000 (80 per cent completed). New boiler house at East Joliet, Ill., cost \$265,000 (65 per cent completed).

Erie

Important Work Undertaken: Construction of store-house, platforms and other attendant facilities at Hornell, N. Y., cost \$165,000 (95 per cent completed). Grade crossing elimination work at Paterson, N. J., cost \$4,000,000 (1 per cent completed). Construction of new power-house at Jersey City, N. J., to centralize power at one point, cost \$420,000 (20 per cent completed).

Florida East Coast

First Track: Okeechobee, Fla., to St. Lucie canal, 23.5 miles. Lemon City, Fla., to Hialeah, 7.3 miles.
Second Track: South Jacksonville, Fla., to Sunbeam, 9.53 miles. Spruce Creek, Fla., to New Smyrna, 4.96 miles. Indrio, Fla., to White City, 9.81 miles.

Important Work Undertaken: New road under construction from St. Lucie canal to Canal Point, 11.5 miles. New line under survey from Canal Point, Fla., to Larkin, 92 miles. New enginehouse and machine shop facilities, etc., at New Smyrna, Fla., cost \$552,000 (15 per cent completed). New car storage yard at Bowden, Fla., cost \$110,000 (90 per cent completed). Reconstruction of St. Johns river bridge, cost \$2,000,000. Reconstruction of bridge over St. Lucie river, Stuart, Fla., cost \$200,000 (15 per cent completed). Renewal of bridge over Jupiter river at Jupiter, Fla., cost \$130,000 (completed). Renewal of bridge over West Palm Beach canal, Canalport, Fla., cost \$175,000 (completed).

Florida, Western & Northern

First Track: Coleman, Fla., to West Palm Beach, 204 miles.
Important Work Undertaken: Building new road from Gross, Fla., to Callahan, 14 miles, and from Valrico, Fla., to Welcome Junction, 13 miles.

Fort Myers Southern

First Track: Fort Myers, Fla., to Bonita Springs, 23.5 miles.

Great Northern

Second Track: Loop Tank, Minn., to Minnesota-Wisconsin state line, 0.50 miles. Lohman, Mont., to Havre, 13.61 miles. Kootenai Falls, Mont., to Troy, 7.43 miles.

High Point, Thomasville & Denton

Important Work Undertaken: Reconstruction of entire line, 35 miles, from High Point, N. C., to High Rock, \$195,000 (completed).

Illinois Central

First Track: Central City, Ky., to Dawson Springs, 38.3 miles. Clarks, Ky., to Stiles, 3.16 miles.
Second Track: Wilderman, Ill., to Layfield, 39.83 miles. Clarks, Ky., to Gilbertsville, 5.15 miles.

Sixth Track: Homewood, Ill., to Matteson, 4.96 miles.
Important Work Undertaken: New road under construction from Akin Junction, Ill., to West Frankfort Junction, 7.3 miles, and from Edgewood, Ill., to Fulton, Ky., 166.2 miles. Construction of new yard, shops and engine terminal facilities at Markham yard near Homewood, Ill., cost \$10,389,000 (55 per cent completed). Grade revision as part of electrification project at Chicago, cost \$5,082,000 (65 per cent completed). Grade separation at Riverdale, Ill., cost \$2,027,000 (35 per cent completed). Grade separation and track elevation at Harvey, Ill., cost \$3,809,000 (85 per cent completed). Grade reduction and grade separation at Paxton, Ill., cost \$800,000 (completed). New passenger station, office building and grade separation at Champaign, Ill., cost \$1,550,000 (completed). Grade reduction from Magnet Hill to near Mattoon, Ill., cost \$888,000 (completed). Change of alignment, grade separation and enlargement of mechanical facilities at Central City, Ky., cost \$1,636,000 (completed). Grade separation and track elevation at Jackson, Miss., cost \$2,262,000 (25 per cent completed). Construction of new track from Homewood to Thornton, cost \$290,000 (completed). Construction of track to serve Orient mine near West Frankfort, Ill., cost \$321,000 (completed). Revision of track and grade layout at East St. Louis, Ill., cost \$172,000 (35 per cent completed). Additional yard tracks at East St. Louis, cost \$767,000 (60 per cent completed). Additional yard tracks and coaling facilities at Gilman, Ill., cost \$260,000 (completed). New coaling facilities at Dubuque, Ia., cost \$109,000 (completed). Rearranging and extending yard tracks at Mounds, Ill., cost \$507,000 (completed). New engine terminal facilities at Council Bluffs, Ia., cost \$414,000 (completed). Construction of concrete sheet pile levee and changes in wharf at New Orleans, La., cost \$409,000 (completed). Remodeling freight house at Memphis, Tenn., cost \$237,000 (completed).

Indiana Harbor Belt

Third Track: Melrose Park, Ill., to La Grange, 3.5 miles.
Important Work Undertaken: Additional tracks and facilities at Blue Island yard, Ill., cost \$250,000 (90 per cent completed). Additional train and yard tracks at Porcupine yard, Ill., cost \$280,000 (completed). New line under survey, 16 miles.

International-Great Northern

Important Work Undertaken: Construction of yard tracks at Houston, Tex., cost \$117,000 (completed). New engine terminal facilities at San Antonio, Tex., cost \$135,000 (80 per cent completed).

Kansas City Southern

First Track: Braden, Okla., to Reynolds, 2.93 miles. Lawton, Kans., westerly, 5.44 miles.
Important Work Undertaken: New line under survey from Leeds, Mo., to Grand View, 12 miles. New line under construction from west of Lawton, Kans., to Military, 3.09 miles. New freight yard and other facilities at Shreveport, La., cost \$466,500 (30 per cent completed). New industrial development and track layout at Shreveport, cost \$164,625 (40 per cent completed).

Kansas City Terminal

Important Work Undertaken: New viaduct over streets at Kansas City, Mo., cost \$150,000 (completed).

Kansas, Oklahoma & Gulf

Important Work Undertaken: New road under construction from Baxter Springs, Kans., to Military Junction, 6.25 miles.

Key System Transit

First Track: In state of California, 0.48 miles.

Lehigh & New England

Important Work Undertaken: New enginehouse, shop, and other terminal facilities at Tamaqua, Pa., cost \$548,000 (95 per cent completed). Revision of grade from Quarry Junction to Portland, Pa., cost \$310,000 (completed).

Lehigh Valley

Important Work Undertaken: Bridge renewal and change of alignment at Pittston Junction, Pa. (work not yet started). Renewal of bridge and construction of passenger and freight station at Easton, Pa. (2 per cent completed). New double-track, six-span deck plate girder bridge at Phillipsburg, N. J. (work not yet started). New union passenger station at Bethlehem, Pa. (35 per cent completed).

Long Island

Third Track: Hillside, N. Y., to Hollis, 1.06 miles.
Fourth Track: Hillside, N. Y., to Floral Park, 4.24 miles.
Important Work Undertaken: Construction of additional main track and elimination of grade crossings in the borough of Queens, Long Island, cost \$3,500,000 (completed). Grade crossing elimination through Richmond Hill, Long Island, cost \$600,000 (completed). Construction of two new float bridges and rearrangement of freight yard on the North Shore line, cost \$1,042,000 (20 per cent completed).

Longview, Portland & Northern

First Track: Longview, Wash., to Rydewood, 26.5 miles.
Important Work Undertaken: Completing the line of this railroad in Cowitz and Lewis counties, Washington, as shown in first track mileage, cost \$5,000,000 (completed).

Los Angeles & Salt Lake

First Track: Los Angeles, Cal., to East San Pedro, 0.71 miles. From near Iron Springs, Utah, 6.2 miles.

Important Work Undertaken: Construction of tourists' camp and luncheon pavilion at Bryce Canon, Utah, cost \$135,000 (75 per cent completed). Purchase and completion of partly constructed hotel building at Cedar City, Utah, cost \$288,000 (completed). New water treating plant at Arden, Nev., cost \$100,000 (completed). Enlarging and relining two tunnels with concrete between Big Springs and Minto, Nev., cost \$370,000 (completed). New freight and passenger station at Glendale, Cal., cost \$154,000 (60 per cent completed). Paving of franchise strip at Glendale, cost \$100,000 (98 per cent completed). Construction of team tracks, additions to automobile dock and gantry crane at Los Angeles, Cal., cost \$159,000 (completed). Railroad's proportion of costs for construction of concrete viaduct over Los Angeles river and railroad tracks at Los Angeles, \$250,000 (20 per cent completed). New freight yard, engine terminal and shop facilities at Los Angeles, cost \$1,750,000 (98 per cent completed). Construction of industrial tracks at Los Angeles, cost \$116,000 (completed). New engine terminal facilities, freight and passenger station and yard tracks at East San Pedro and Wilmington, Cal., cost \$232,000 (86 per cent completed). Purchase of site for additional freight facilities at Long Beach, Cal., cost \$134,000 (completed).

Louisville & Nashville

Second Track: Montgomery, Ala., to Catoma, 3.4 miles. Baileys, Ky., to Wallisend, 1.8 miles. Wallisend, Ky., to Wenrick, 1 mile. Acosta, Ky., to Cardinal, 19.4 miles. Fort Estill, Ky., to Slate Lick, 13.2 miles.

Important Work Undertaken: Construction of Rigolets bridge, 30 miles north of New Orleans, cost \$3,128,000 (70 per cent completed). Construction of Chef Menteur bridge, 19 miles north of New Orleans, cost \$1,513,871 (30 per cent completed). Filling in bridges and trestles south of Louisville, Ky., cost \$507,000 (39 per cent completed). New engine-house, shop and other facilities at New Orleans, cost \$254,351. New passenger station at Bowling Green, Ky., cost \$170,534 (20 per cent completed). New shop buildings at Corbin, Ky., cost \$175,580 (50 per cent completed). Reconstruction of Green river bridge at Munfordville, Ky., cost \$330,000.

Maine Central

Important Work Undertaken: Reconstruction of superstructure of Kennebec river bridge at Waterville, Maine, cost \$180,000 (completed).

Michigan Central

Important Work Undertaken: New hump yard at North Toledo, Ohio, cost \$3,200,000 (completed). New double-track arch bridge over Niagara river, Niagara Falls, Ont., cost \$2,250,000 (completed). Grade separation at West Detroit, Mich., cost \$600,000 (50 per cent completed). Additional interchange tracks at Hartsdale, Ind., cost \$107,000.

Minneapolis, St. Paul & Sault Ste Marie

Important Work Undertaken: Extension to concrete ore dock at Ashland, Wis., cost \$1,500,000 (85 per cent completed).

Mississippian

First Track: Smithville, Miss., to Fulton, 16 miles.

Mississippi Southern

Important Work Undertaken: Acquisition from Gulf & Ship Island of 17 miles of main line between Lumberton, Miss., and Maxie, including terminals at Lumberton; reconstruction of entire line and filling in of 12 bridges.

Missouri-Kansas-Texas

Important Work Undertaken: New seven-story concrete and brick storage warehouse at Dallas, Texas, cost \$475,000 (completed). Installing rock bank protection at Canadian river crossing at Eufaula, Okla., cost \$100,000 (completed).

Missouri Pacific

Important Work Undertaken: New line under survey from Epps, La., to Delhi, 10.3 miles. Reconstruction of viaduct at St. Louis, Mo., cost \$145,680 (67 per cent completed). New hospital at Little Rock, Ark., cost \$500,000 (85 per cent completed). Strengthening bridges at various points on system, cost \$1,300,000 (90 per cent completed). Reconstruction of bridge at Osage, Mo., cost \$292,000 (90 per cent completed). Strengthening, raising and extending bridge at Kansas City, Kans., cost \$225,000 (completed). Track elevation and trestle construction at Corning, Ark., cost \$250,000 (completed). New shop facilities at St. Louis, cost \$778,000 (completed). New oil storing facilities at Snackover, Ark., cost \$375,000 (completed). Additional tracks and rearrangement of existing tracks at Kansas City, Mo., cost \$255,000 (completed). River protection at Yoncapin, Ark., cost \$135,000 (completed). New mine spur at Benton, Ill., cost \$216,000 (85 per cent completed). Filling in timber trestles on White River division, \$154,000 (66 per cent completed). Bridge renewal at Fort Gibson, Okla., cost \$194,000 (completed).

Monongahela Railway

Important Work Undertaken: Construction of slope wall along Monongahela river; two additional tracks and revision of present track layout at Brownsville, Pa., cost \$131,000 (90 per cent completed).

Nashville & Atlantic

First Track: Rocky River, Tenn., to Rocky Branch, 1.55 miles.

Nashville, Chattanooga & St. Louis

Important Work Undertaken: New eight-story concrete, brick and terra cotta office building at Nashville, Tenn., cost \$227,500 (completed). New passenger station and office building at Paducah, Ky., cost \$108,295 (completed).

Newburg & South Shore

First Track: In the state of Ohio, 0.36 miles.

New York Central

First Track: Post Road, N. Y., to Feura Bush, 13.5 miles. Ravena, N. Y., to Selkirk Junction, 3.7 miles. Ravena, N. Y., to Selkirk, 4.4 miles.

Second Track: Post Road, N. Y., to Feura Bush, N. Y., 13.5 miles.

Third Track: Martin, Ohio, to Graytown, 3.94 miles.

Fourth Track: Martin, Ohio, to Graytown, 3.94 miles.

Important Work Undertaken: New line under construction from Stuyvesant, N. Y., to Schodack Junction, 9 miles. Five additional storage tracks on lower level at Grand Central Terminal, New York, cost \$172,000 (com-

pleted). Additional storage battery facilities at Grand Central Terminal, cost \$235,000 (10 per cent completed). Alteration and enlargement of passenger facilities at Grand Central Terminal, cost \$230,000 (40 per cent completed). New team yard at New York, cost \$100,000 (completed). New 20,000-kw. turbo-generator at Port Morris, N. Y., cost \$680,000 (80 per cent completed). Extension to Kings Bluff yard at Weehawken, N. J., cost \$100,000 (85 per cent completed). New interchange yard at Weehawken, N. J., cost \$125,000 (72 per cent completed). Widening pier 6 and installing gantry cranes at Weehawken, cost \$350,000 (80 per cent completed). Grade crossing elimination in New Jersey, cost \$904,000 (12 per cent completed). Grade crossing elimination at Tarrytown, N. Y., cost \$390,000 (14 per cent completed). Reconstruction of bridge at Crafts, N. Y., cost \$112,000 (92 per cent completed). Double-track detour at Garrison, N. Y., cost \$794,000 (completed). Opening tunnel at Camelot, N. Y., cost \$350,000 (42 per cent completed). Building retaining wall at Newburgh, N. Y., cost \$106,000 (completed). Grade crossing elimination at West Park, N. Y., cost \$147,000 (85 per cent completed). Building Hudson River Connecting Railroad and bridge over river, cost \$25,000,000 (90 per cent completed). Rebuilding upholstery shop at West Albany, N. Y., cost \$211,000 (12 per cent completed). New overhead bridge at Hoffmans, N. Y., cost \$143,000 (58 per cent completed). Track changes at Little Falls, N. Y., cost \$133,000 (60 per cent completed). New adzing and boring plant at Rome, N. Y., cost \$107,000 (66 per cent completed). Rebuilding bridge at East Syracuse, N. Y., cost \$257,000 (60 per cent completed). Grade elimination and reduction at Syracuse, N. Y., cost \$178,000 (56 per cent completed). Reconstruction of under-crossing at Fox Ridge, N. Y., cost \$313,000 (completed). Double-track crossing and interlocking plant at Geneva, N. Y., cost \$142,000 (84 per cent completed). Connection between main line and West Shore and between Gardenville and West Shore, near Depew, N. Y., cost \$1,700,000 55 per cent completed). Purchase and conversion of Ferguson steel plant into paint shop at Buffalo, N. Y., cost \$435,000 (60 per cent completed). New sidings at Diamondville, Pa., cost \$164,000 (completed). Grade separation at Forsythe, N. Y., cost \$222,200 (20 per cent completed). Elevation of main and yard tracks for subway at Erie, Pa., cost \$343,000 (90 per cent completed). Installation of new car dumper at Ashtabula harbor, Ohio, cost \$900,000 (25 per cent completed). Replacement of ore bridge at Ashtabula harbor, cost \$360,000 (15 per cent completed). Storage yard tracks at Ashtabula harbor, cost \$155,700 (5 per cent completed). Grade separation at Painesville, Ohio, cost \$343,000 (30 per cent completed). Interchange tracks at Painesville, cost \$150,000 (80 per cent completed). Renewal of overhead bridge at Cleveland, Ohio, cost \$200,000 (12 per cent completed). Relocation of passenger and freight station and yard tracks at Youngstown, Ohio, cost \$532,000 (95 per cent completed). Grade separation at Elyria, Ohio, cost \$1,795,000 (85 per cent completed). Grade separation at Toledo, Ohio, cost \$370,000 (98 per cent completed). New adzing and boring shops at Air Line junction, Ohio, cost \$117,500 (10 per cent completed). Grade separation at Detroit, Mich., Green and Central avenues, cost \$188,000 (completed), and at Springwells, Lawndale and Fort streets, cost \$425,000 (50 per cent completed). Additional yard tracks at Elkhart, Ind., cost \$460,000 (85 per cent completed). Additional yard tracks at South Bend, Ind., cost \$143,000 (completed). New bridges at Dune Park, Ind., cost \$293,000 (5 per cent completed). Yard extension at West Kankakee, Ill., cost \$300,000 (4 per cent completed). New machine shop and facilities at Gibson, Ind., cost \$130,400 (25 per cent completed). Extension to eastbound classification yard at Gibson, cost \$235,000 (5 per cent completed). New 1,000-ton coaling plant at Gibson, cost \$283,000 (completed). Additional yard and train tracks at Gibson, cost \$256,000 (completed).

New York, Chicago & St. Louis

Second Track: Arcadia, Ohio, to Green Springs, 13.68 miles.

Important Work Undertaken: Construction of bridge over Walworth Run at Cleveland, Ohio, cost \$500,000. Construction of bridge at Rocky River, Ohio, (10 per cent completed). New yard at Stony Island, Ill., (25 per cent completed). New yard at New Haven, Ind., (completed).

New York, New Haven & Hartford

Important Work Undertaken: Electrification of 25 miles of line between South Norwalk and Danbury, Conn., cost \$350,000 (25 per cent completed). Additional yard tracks and construction of two-track bridge for separation of engine and receiving yard leads at Cedar Hill terminal at Cedar Hill, Conn., cost \$369,000 (85 per cent completed). Building six-track bridge over Capital avenue at Hartford, Conn., cost \$266,500 (completed). New hump classification yard at South Worcester, Mass., cost \$174,000 (completed). Bridge strengthening and track renewal at Boston, Mass., cost \$198,000 (90 per cent completed).

Norfolk & Western

First Track: On Coal Creek branch, Va., 1.77 miles. On Kenova Belt Line, W. Va., 1.06 miles.

Third Track: Between Naugatuck, W. Va., and Kenova, 20.22 miles.

North & South

First Track: Salt Creek, Wyo., to Ilco, 35.2 miles.

Northern Pacific

First Track: Armell Junction, Mont., to Colstrip, 30.75 miles.

Important Work Undertaken: New bridge across Mississippi river and change in line at Minneapolis, Minn., cost \$1,750,000 (completed). Building Rosebud branch into coal fields, cost \$1,570,000 (completed). Grade separation at Monroe street, Minneapolis, cost \$255,000 (92 per cent completed). New sewer for coach yard at St. Paul, Minn., cost \$260,000 (completed). New power plant at Brainerd, Minn., cost \$565,000 (16 per cent completed). New boiler and tank shop at Livingston, Mont., cost \$180,000 (completed).

Northwestern Pacific

Second Track: Yolanda, Cal., to Manor, 2 miles.

Important Work Undertaken: Enlarging tunnel near Greenbrae, Cal., for second track, cost \$215,424 (100 per cent completed).

Oregon Short Line

First Track: From Crane, Ore., to Burns, 30.21 miles.

Important Work Undertaken: New lines under construction from Rogerson, Ida., to Wells, Nev., 94 miles; from Orchard, Ida., to Boise, 27.78 miles, and from Nampa, Ida., to Senna, 2.66 miles. First unit of new power plant at Pocatello, Ida., cost \$390,000 (95 per cent completed). Construction of coaling station and power plant at Orchard, cost \$107,000 (85 per cent completed). New brick passenger station at Nampa, cost \$150,000 (75 per cent completed). Reconstruction of bridge over Boise river, cost \$137,000 (completed). New brick passenger station with stucco finish at Boise, Ida., cost \$230,000 (10 per cent completed).

Oregon-Washington Railroad & Navigation

First Track: Prunedale, Ore., to Umapine, 3.62 miles.
Important Work Undertaken: Replacing of bridge over Chehalis river near Galvin, Wash., cost \$171,000 (completed). Renewal of bridge over Yakima river near Benton City, Wash., cost \$146,000 (completed). Construction of new 1,072-ft. wharf and covered dock and yard tracks at Portland, Ore., cost \$370,000 (10 per cent completed). Reconstruction of bridge over North Fork Coeur d'Alene river, near Enaville, Ida., cost \$111,000 (completed).

Pacific Electric

First Track: East San Gabriel, Cal., to Temple, 2.01 miles. In Santa Monica, Cal., 0.46 miles. In Long Beach, Cal., 1.33 miles.
Second Track: In Long Beach, 0.2 miles. In San Pedro, Cal., 0.61 miles.
Important Work Undertaken: New double track tunnel at Los Angeles, Cal., cost \$330,000 (50 per cent completed).

Pennsylvania System

First Track: At Chester, Pa., 0.63 miles. At Bellwood, Pa., 0.08 miles. At Royersford, Pa., 0.10 miles. Near Powhatan, Ohio, 2.89 miles.
Second Track: On Kensington & Tacny branch, Philadelphia, Pa., 0.25 miles. Near Fetterman, Pa., 4.25 miles. Near Franklinville, N. Y., 2.04 miles. Toledo, Ohio, to Alexis, 4.52 miles. Troyton, Ohio, to Sugar Camp, 1.74 miles. Near Indianapolis, Ind., 0.24 miles. Gem, Ind., to Indianapolis, 7.12 miles. Cromers, Ohio, to Burgoon, 4.92 miles. Weirton Junction, W. Va., to East Weirton, 1.9 miles. Near Olean, N. Y., 0.53 miles.
Fourth Track: Near Sarver, Pa., 0.04 miles. Pittsburgh, Pa., to Etna, 1.6 miles.

Important Work Undertaken: Track elevation and terminal yards at South Philadelphia, cost \$15,500,000 (20 per cent completed). New 10,000,000-gal. reservoir at East Altoona, Pa., cost \$150,000 (completed). Additional shops at Altoona, cost \$4,200,000 (completed). Two new bridges over Susquehanna river, cost \$1,655,000 (75 per cent completed). Overhead bridge at Renovo, Pa., cost \$120,000 (78 per cent completed). Overhead bridge at Lilly, Pa., cost \$165,000 (completed). Reconstruction of bridge at Conemaugh, Pa., cost \$240,000 (completed). Reinforced concrete viaduct at Beck's Run, Pittsburgh, Pa., cost \$545,000 (completed). Track elevation at North Side, Pittsburgh, cost \$2,365,000 (completed). Four-tracking North Side line, Pittsburgh, cost \$715,000 (completed). Jump-over bridge and interlocking tower at Pittsburgh, cost \$435,000 (completed). New engine-house and terminal facilities at Sharpsburg, Pa., cost \$855,000 (completed). New power transmission line from Philadelphia, to Westville, N. J., cost \$920,000 (completed). Additional platforms, platform tracks and storage tracks at Jersey City, N. J., cost \$275,000 (90 per cent completed). Reconstruction of bridge at Jersey City, cost \$290,000 (45 per cent completed). Overhead bridge at Monmouth Junction, N. J., cost \$115,000 (5 per cent completed). Construction of car level platforms and additions to passenger facilities at Trenton, N. J., cost \$1,265,000 (50 per cent completed). Reconstruction of car repair and paint shops at Pavonia, N. J., cost \$215,000 (completed). New float bridge and other facilities at Greenville yard, Jersey City, cost \$430,000 (50 per cent completed). Overhead bridge at Philadelphia, cost \$185,000 (completed). Grading and track work for double track at Sixtieth street branch at Philadelphia, cost \$2,450,000 (50 per cent completed). Overhead bridge at Edge Moore, Del., cost \$240,000 (80 per cent completed). Reconstruction of bridge, South Side, Pittsburgh, cost \$130,000 (completed). Construction of fifth and sixth tracks and change of line at Emsworth, Pa., cost \$225,000 (60 per cent completed). Relocation of main line from West Rochester, Pa., to Beaver Falls, Pa., cost \$3,040,000 (20 per cent completed). Grade crossing elimination at Mansfield, Ohio, cost \$105,000 (completed). Grade separation at Ft. Wayne, Ind., cost \$1,235,000 (60 per cent completed). New Twelfth street viaduct at Chicago, Ill., cost \$475,000 (75 per cent completed). Track elevation at Cleveland, Ohio, cost \$690,000 (50 per cent completed). Relocation of state highway to permit future third and fourth tracks near Barclay's Crossing, Pa., cost \$100,000 (completed). New low grade line, Kenwood to Rochester, Pa., cost \$1,120,000 (completed). Wye track, storage yard and additional facilities, Niles to Warren, Ohio, cost \$765,000 (completed). Additional yard tracks and facilities at Girard, Ohio, cost \$385,000 (96 per cent completed). New eastbound departure yard at Ft. Wayne, Ind., cost \$150,000 (60 per cent completed). Rearrangement and enlargement of yard at Toledo, Ohio, cost \$304,000 (50 per cent completed). Additional engine terminal facilities at Toledo, cost \$487,500 (15 per cent completed). Additional yard facilities and lighting system at Sandusky, Ohio, cost \$342,000 (completed). Reconstruction of tracks in streets at Toledo, cost \$193,232 (completed). Grade separation at Toledo, cost \$680,200. New enginehouse and coach yard at Detroit, Mich., for joint use with the Wabash and Pere Marquette, cost \$1,286,000 (completed). Grade separation in Wayne County, Mich., cost \$177,581 (completed). New coach yard and rearrangement of passenger yard and station facilities at Cincinnati, Ohio, cost \$260,000 (80 per cent completed). Track elevation at Indianapolis, Ind., cost \$1,500,000 (work not yet started). New passenger engine terminal at Columbus, Ohio, cost \$3,500,000 (completed). New undergrade crossing at Jeffersonville, Ind., cost \$105,000 (75 per cent completed). New freight station facilities at Cincinnati, cost \$419,220 (30 per cent completed). Additional property for classification yard at Colehour, Ind., cost \$198,000 (75 per cent completed). Track elevation between Fifty-fifth and Fifty-sixth streets, Chicago, cost \$789,000 (90 per cent completed). Track elevation at Ogden Avenue, Chicago, cost \$411,406 (90 per cent completed). Additional interchange tracks at Pittsburgh, cost \$315,000 (50 per cent completed). Additional classification yard tracks at Weirton Junction, W. Va., cost \$323,000 (70 per cent completed). New scrap yard, building, gantry cranes, etc., at Conway, Pa., cost \$140,000 (90 per cent completed). Grade revision, coaling station and water plant at Hammondsville, Ohio, cost \$200,000 (95 per cent completed). Additional tracks and bridge trusses across Mahoning river at Haselton, Ohio, cost \$136,000 (25 per cent completed).

Pere Marquette

First Track: From near Erie, Mich., to Michigan-Ohio state line, 1 mile. Michigan-Ohio state line to Hallett, Toledo, Ohio, 1.83 miles.
Second Track: From near Erie, Mich., to Michigan-Ohio state line, 2.67 miles. Michigan-Ohio state line to Alexis, Toledo, Ohio, 0.38 miles.
Important Work Undertaken: Additional shop buildings and equipment at Grand Rapids, Mich., cost \$1,850,000 (completed). New freight yard and engine terminal facilities at Erie, Mich., cost \$2,000,000 (completed). Reconstruction of bridge over Saginaw river, Saginaw, Mich., cost \$110,000 (completed).

Pittsburgh, Chartiers & Youghiogheny

Important Work Undertaken: New road under construction from Van Emman, Pa., to Eighty-Four, 8.36 miles.

Rapid Railroad

Second Track: Detroit, Mich., to Mt. Clemens, 4.55 miles.

Reading Company

Important Work Undertaken: Construction of viaduct and change of alignment at Ringtown, Pa., cost \$680,000 (27 per cent completed). New rail and ferry terminal at Camden, N. J., cost \$3,500,000 (completed). New 120-ton car dumper, power plant, etc., at Port Richmond, Philadelphia, Pa., cost \$1,650,000 (completed). New hill-to-hill bridge for grade crossing elimination at Bethlehem, Pa., cost shared by Bethlehem Bridge Commission, Central of New Jersey, Lehigh Valley and others, \$2,740,000 (completed). New engine terminal facilities at Rutherford, Pa., \$440,000 (59 per cent completed). Changing channel of Schuylkill river to provide for additional main track and tunnel elimination at Port Clinton, Pa., cost \$432,631 (33 per cent completed). Renewal of bridges north of Birdsboro, Pa., cost \$387,562 (26 per cent completed). New union passenger station at Bethlehem, Pa., with Lehigh Valley, cost \$362,000 (23 per cent completed). Additional ore handling machinery, pier 14, Port Richmond, Pa., cost \$915,000 (plans being prepared). Bridge renewal at Wyomissing, Pa., cost \$114,500 (69 per cent completed). Construction of new grain elevator at Philadelphia, cost \$284,000 (plans being prepared). New overhead highway bridge near Allentown, Pa., cost \$104,000 (78 per cent completed). Double-track concrete arch bridge over Susquehanna river, Harrisburg, Pa., cost \$2,050,000 (completed).

Richmond, Fredericksburg & Potomac

Important Work Undertaken: Reconstruction of bridge over Neabsco Creek, cost \$180,000 (completed). Reconstruction of bridge over Quantico Creek, cost \$250,000 (completed).

Rutland

Important Work Undertaken: New power house at Rutland, Vt., cost \$156,000 (completed).

St. Louis-San Francisco

Second Track: Valley Park, Mo., to Eureka, 9.31 miles.
Important Work Undertaken: New engine terminal at Lindenwood, St. Louis, Mo., cost \$800,000 (completed).

San Antonio & Aransas Pass

Important Work Undertaken: Construction of a new bridge over Brazos river, near Wallis, Tex., (7 per cent completed).

San Benito & Rio Grande Valley

Important Work Undertaken: New line under survey from Santa Maria, Tex., to Sammons, 31 miles. Estimated cost, \$450,000.

Southern

Important Work Undertaken: New line under construction from Bulls Gap, Tenn., to Leadvale, 17 miles. From Beverly, Tenn., to John Sevier yard, 4 miles. Around the city of Spartanburg, S. C., 3 miles.

Southern Pacific

Second Track: Nutglade, Cal., to Dunsmuir, 0.9 miles. Sparks, Nev., to Wells, 7.07 miles. Emigrant Gap, Cal., to Andover, 7.5 miles.

Important Work Undertaken: Additional 5000 kw. turbo-generator at Oakland, Cal., cost \$223,000 (33 per cent completed). Additional ferry slip at Oakland, cost \$170,000 (completed). New wharf and steamer shed at Sacramento, Cal., cost \$210,000 (completed). Relining tunnel with concrete, Elmore, Cal., cost \$325,000 (10 per cent completed). Bridge renewal at Reliance, Ore., cost \$114,000 (completed). New creosoted pile bulkhead at Long Beach, Cal., cost \$234,000 (completed). Street changes at Pasadena, Cal., cost \$125,000 (25 per cent completed). Additional shop buildings at Los Angeles, Cal., cost \$607,000 (completed). Relining tunnel with concrete at Haasson, Cal., cost \$317,000 (50 per cent completed). Change of line at Yuma, Ariz., cost \$877,000 (75 per cent completed). Additional grading for change of line at Yuma, cost \$121,000 (completed). Construction of 5 miles of second track, cost \$185,000 (60 per cent completed). Construction of automobile ferry slip at Richmond, Cal., cost \$115,000 (completed).

HOUSTON & TEXAS CENTRAL—Extending Dallas, Tex., belt line, cost \$828,000 (10 per cent completed).

TEXAS & NEW ORLEANS—Extension of machine shops at Houston, Tex., cost \$79,433 (completed). Car repair yard at Houston, cost \$424,916 (completed). New wharf facilities at Houston, cost \$1,000,000 (3 per cent completed). Grade crossing separation at Beaumont, Tex., cost \$110,000 (5 per cent completed). Strengthening bridges on Dallas-Sabine branch, cost \$259,000 (completed). Reconstruction of Neches river bridge at Beaumont, cost \$119,000 (completed). Remodelling treating plant and installing power plant at Englewood, Tex., cost \$118,000 (completed).

MORGAN'S LOUISIANA & TEXAS—Rearranging and extending engine terminals at Lafayette, La., cost \$447,800 (completed).

GALVESTON, HARRISBURG & SAN ANTONIO—Reconstruction and extension of shop and engine terminal facilities at San Antonio, Tex., cost \$83,088 (completed). Extension of engine terminal at El Paso, Tex., cost \$243,000 (completed).

GALVESTON, HARRISBURG & SAN ANTONIO: Line revision at various points on system, cost \$179,000. Change in grade near Alleyton, Tex., cost \$100,000 (completed).

So. San Francisco Belt

First Track: In the state of California, 2 miles.

Texarkana & Fort Smith

Important Work Undertaken: New yard layout at Port Arthur, Tex., cost \$466,500 (30 per cent completed).

Union Pacific

First Track: Fort Collins, Colo., to Buckeye, 17.07 miles.
Important Work Undertaken: New passenger station and other facilities at Laramie, Wyo., cost \$160,000 (completed). Construction of open cut to replace present twin tunnels near Edison, Wyo., cost \$125,000 (completed). Relining old Wahsatch tunnel with concrete near Curvo, Utah, cost \$255,000 (completed). Railroad's share of cost of renewing south and north approaches to Seventh street viaduct at Kansas City, Kans., cost \$254,000 (10 per cent completed). Construction of additional yard track at Kansas City, Kans., cost \$156,000 (completed).

Upper Merion & Plymouth

First Track: At Swedeland, Pa., 0.41 miles.

Virginian

First Track: Extension of Guyandot river branch, W. Va., 1.19 miles. *Important Work Undertaken:* Double tracking and relining tunnel at Kegley, W. Va., cost \$176,384 (completed). Electrification of 134 miles of line from Roanoke, Va., to Mullens, W. Va., cost \$12,309,000 (35 per cent completed). Construction of new second track from Clarks Gap, W. Va., to Matoaka, cost \$493,220 (90 per cent completed). Extension of switching leads at Elmore yard, cost \$103,292 (completed). Construction of new steel coal pier, car dumpers, elevators, etc., at Sewalls Point, Va., cost \$3,300,000 (completed).

Yazoo & Mississippi Valley

Important Work Undertaken: New passenger station facilities at Baton Rouge, La., cost \$758,000 (80 per cent completed). New freight station facilities at Baton Rouge, cost \$22,000 (completed).

Yosemite Valley

Important Work Undertaken: Relocation of 20 miles of main line between Merced Falls, Cal., and Detwiler, cost \$3,000,000 (1 per cent completed).

Railway Construction in Canada in 1924**Canadian National**

First Track: Prince Albert, Sask., to Paddockwood, 23 miles. Peebles, Sask., southerly, 22 miles. West of Hedgeville, Sask., to Neidpath, 11 miles. North of Ste. Rose, Man., to Rorketon, 22 miles. Grande Fresniere, Que., to Rinfret Junction, 12 miles. Donnacona cut-off, Que., 6.3 miles. At Cobourg, Ont., 0.14 miles. At Lynden Junction, Ont., 0.34 miles. At Nakina, Ont., 0.77 miles. At Yelsum, Alta., 0.14 miles. Yelsum, B. C., to Rainbow, 18.05 miles. At Montreal, Que., 0.13 miles. At Granby, Que., 1.33 miles. At Oshawa, Ont., 0.62 miles.

Second Track: At Thorold, Ont., 0.96 miles. Kakabeka Falls, Ont., to Comtee, 13.21 miles. Baynam, Man., to Knight, 7.05 miles. At Swartz Creek, Mich., 4.35 miles.

Important Work Undertaken: New lines under construction from L'Verna, Alta., westerly, 50 miles. From Dunblane, Sask., to Central Butte, 37.6 miles. From Hanna, Alta., to Warden, 62.17 miles. From near Deerholme, B. C., to Cowichan Bay, 7.36 miles.

Renewal of bridge over Buctouche river, N. B., cost \$173,500 (50 per cent completed). Construction of a connection near Donnacona, Que., cost \$355,200 (completed). New brick stores building at Point St. Charles, cost \$260,000 (85 per cent completed). Renewing and strengthening wharves at Portland, Me., cost \$176,500 (completed). Construction of a connection near Granby, Que., cost \$143,960 (completed). Improvements to enginehouse facilities at Stratford, Ont., cost \$161,700 (completed). Construction of a freight connection between Toronto Suburban Railway and the Canadian National at Toronto, cost \$202,000 (95 per cent completed). New yard and engine terminal facilities at James Bay Junction, cost \$114,167 (30 per cent completed). Replacement of trestle over Postagoni river, cost \$103,000

(completed). Replacement of trestle at mile 58.7 Dorion subdivision, cost \$112,000 (completed). Building Long Lake cut-off and Nakina yard, cost \$300,000 (completed). Double-tracking between Kakabeka Falls and Moke-man, cost \$378,000 (completed). Double-tracking and grade revision on the Kashabowie subdivision, cost \$131,000 (completed). Grade and line revision on Sprague subdivision, cost \$215,000 (completed). Track changes to provide double track in Portage la Prairie, cost \$108,090 (completed). Replacement of trestle on Miniota subdivision, cost \$288,000 (50 per cent completed). Extension of enginehouse stalls at Melville, Sask., cost \$115,000 (completed). Renewal of part of trestle over Red Deer river, Alta., cost \$131,000 (70 per cent completed). New engine terminal facilities at Jasper, Alta., cost \$154,120 (completed). Additions to Jasper Park Lodge, cost \$160,000 (completed). Grade separation in Detroit, Mich., cost \$637,300 (50 per cent completed). Additional engine terminal facilities at Belsay, Mich., cost \$164,000 (completed). Construction of second track in Michigan, cost \$332,920 (completed). Grade separation and second track in Michigan, cost \$262,650 (95 per cent completed).

Canadian Pacific

First Track: Tufnell, Sask., to Nipawan, 131.1 miles. Lanigan, Sask., to Melford, 34.3 miles. Mildred, Sask., to McMorran, 61.6 miles. Mackinac, Sask., to Matador, 43.2 miles. Wymark, Sask., to Coderre, 64 miles. Cutknife, Sask., to Battle River, 45.5 miles. Leader, Sask., to Schuyler, 25 miles.

Important Work Undertaken: This work included a large passenger station, subway, freight station and offices at Trois Rivières, Que., new station and offices at Schreiber, Ont., and new stations at 13 other points on the system. Additional facilities were provided for at Post McNicoll grain elevators. New enginehouses or extensions at Trois Rivières, St. Gabriel, Grand Piles, Que., Chalk River and Schreiber, Ont., and other points on the system. Grade separation in the northwest section of Toronto, Ont. Renewals of bridges on lines east to accommodate heavier power. New coal plants at Reston, McLean, Eyebrow and Cranbrook on western lines. Extensions to freight car shops at Ogden, near Calgary.

Central Canada

First Track: In the Province of Alberta, 13 miles.

Edmonton, Dunvegan & British Columbia

First Track: In the Province of Alberta, 15.28 miles.

Nipissing Central

First Track: Swastika, Ont., to Larder Lake, 23 miles.

Temiskaming & Northern Ontario

First Track: From near Island Falls Junction, Ont., 23.6 miles. Lorrain Junction, Ont., to Silver Centre, 17 miles.

Toronto, Hamilton & Buffalo

Important Work Undertaken: Revision of alignment near Hamilton, Ont., cost \$138,000 (75 per cent completed).

Statistical Review of 1924

(Continued from page 57)

date of this article, compared with each month of the year 1923. The total for October, 1924, is estimated in part.

Reserve Equipment

With the heavy freight traffic of the year 1924, particularly in the first and fourth quarters, the railways had at all times a large reserve of equipment. This is indicated by the statistics of stored locomotives and surplus freight cars, which throughout the whole year were greater in number than in 1923, even when the traffic was on a higher level.

So significant is this comparison between the two years, as a relative measure of operating efficiency, that two charts are presented to tell the story in graphic form. Chart D gives the number of stored or reserve locomotives, as of the first of each month of 1923 and 1924; Chart E is a similar showing for surplus or reserve freight cars. The curves for 1924 are at all points higher than for 1923; in most cases, appreciably higher.

Comparison of 1924 with Five-Year Average

The Bureau of Railway Economics has been experimenting during the last two years with the problem of a normal standard of railway operation, against which the various results of any one year may be compared. The problem is not an easy one, and offers no exact or satisfactory solution, but the Bureau has made an approach to it by assuming that the complete record of railway operation, since the close of the war supplies an approximate standard. In this respect, the Bureau has taken the

results of the five complete years from January 1, 1919, to December 31, 1923, and has reduced those results to an annual average. Without considering this annual average as a normal measure for any particular factor of railway performance, it may yet be taken as an approximate standard for the operations of any post-war year.

This has been done with regard to a number of traffic and financial factors for the year 1924, and the results are shown in Chart F.

Chart F is constructed with a heavy base line running through the center, representing the annual average of the five years mentioned, this average being taken in each case as 100 per cent. The results for 1924 are indicated on the chart by horizontal bars, extending as much above or below the base line as the particular results are relatively above or below the annual average which the base line represents. Too much emphasis should not be placed upon this chart, although it offers food for some interesting and significant reflections.

There is one departure from the general method described above. The standard for rate of return on investment is not taken as the annual average of the five-year period, as in the case of the other factors, but is taken as 5¾ per cent, that being the normal fair return laid down under the provisions of the Transportation Act.

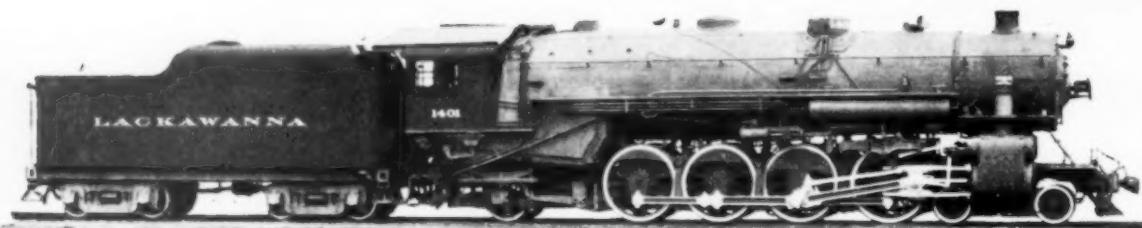
It is hoped to continue this chart in future years, averaging into the base line each year the results of the year just closed. In other words, the results for 1924 are compared with the five-year average from 1919 to 1923, inclusive; the results for 1925 will be compared with a six-year average, 1919 to 1924; and so for later years. As the years go by, the base line will in fact come

(Continued on page 82)



Indiana Harbor
Belt Eight-wheel
Switcher.
Tractive force,
51,200 lb.
Built by Lima.

New Haven
Three-Cylinder
Eight-wheel
Switcher.
Tractive Force,
60,600 lb.
Built by
American.



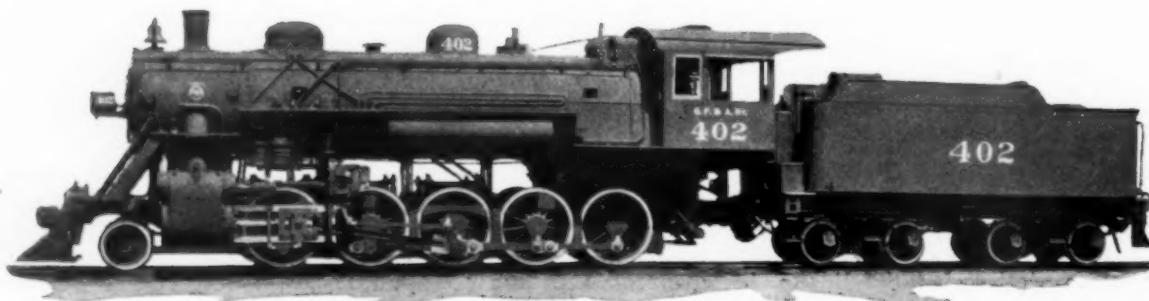
Lackawanna
Mountain Type.
Tractive Force,
53,000 lb.
Built by
American.

Rock Island
Three-Cylinder
Pacific.
Tractive force,
46,400 lb.
Built by
American.



Chicago & Eastern
Illinois Pacific.
Tractive Force,
43,900 lb.
Built by Lima.

Georgia, Florida
& Alabama
Decapod.
Tractive Force,
46,510 lb.
Built by Baldwin.



Some of the Interesting Locomotive Orders of 1924



Illinois Central Mikado—One of 25 Built by Lima Locomotive Works

Locomotive Orders in 1924

Considerably less than in 1922—Recent locomotive buying not on same large scale as cars

By F. W. Kraeger

LOCOMOTIVES ordered for domestic service in the United States during 1924 totaled 1,413, according to *Railway Age* compilations. This total compared with 1,944 in 1923, and with 2,600 in 1922. It represented an amount of business much below average. Since 1901 there have been but four years other

than 1924 in which domestic locomotive purchases have failed to exceed even such a small total as 1,500.

TABLE I—LOCOMOTIVE ORDERS IN 1924	
For service in the United States.....	1,413
For service in Canada.....	71
For service in Mexico.....	50
For export to other countries.....	92
Grand total	1,626

than 1924 in which domestic locomotive purchases have failed to exceed even such a small total as 1,500.

Orders placed by railroads in Canada with Canadian builders totaled 71, comparing with 82 in 1923, and with 68 in 1922. The National Railways of Mexico were heavy purchasers of equipment in United States markets; their buying included 50 locomotives, as well as large numbers of cars. Other export business outside of the Mexican purchases, shown by the *Railway Age* tabulations, totaled 92 locomotives.

The number of locomotives built for domestic service—in contradistinction to new business taken as shown in

TABLE II—ORDERS FOR LOCOMOTIVES SINCE 1901
Domestic Orders Only

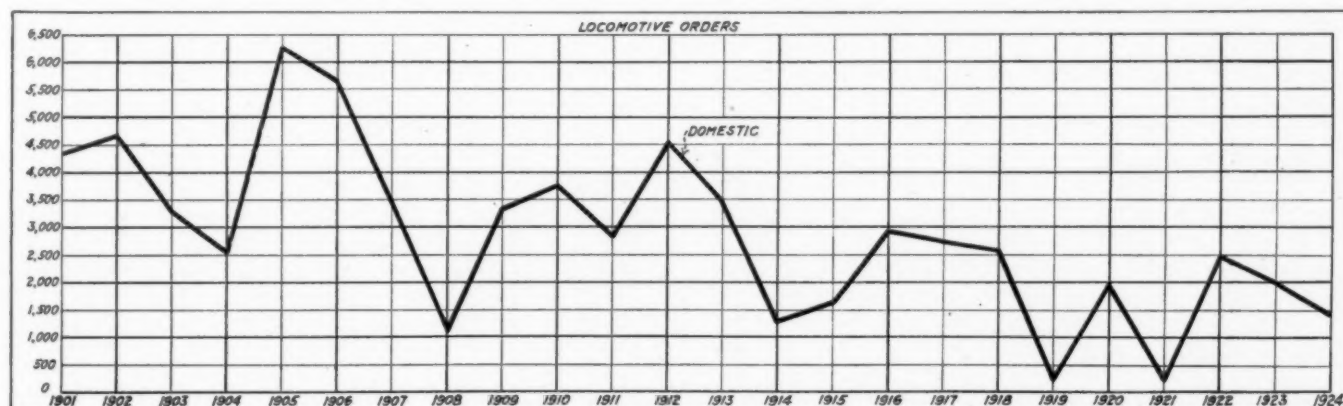
Year	Loco- motives	Year	Loco- motives
1901.....	4,340	1908.....	1,182
1902.....	4,665	1909.....	3,350
1903.....	3,283	1910.....	3,787
1904.....	2,538	1911.....	2,850
1905.....	6,265	1912.....	4,515
1906.....	5,642	1913.....	3,467
1907.....	3,482	1914.....	1,265

Domestic and Foreign

Year	Domestic	Canadian	Export	Total
1915.....	1,612	.....	850	2,462
1916.....	2,910	.....	2,983	5,893
1917.....	2,704	.....	3,438	6,142
1918.....	2,593	209	2,086	4,888
1919.....	214	58	989	1,170
1920.....	1,998	189	718	2,905
1921.....	239	35	546	820
1922.....	2,600	68	131	2,799
1923.....	1,944	82	116	2,142
1924.....	1,413	71	142	1,626

Prior to 1918, Canadian orders included under "Domestic."

It would be unwarranted exaggeration to say that the locomotive business in the United States in 1924 was entirely satisfactory, or that it has become satisfactory more



Locomotive Orders, 1901 to 1924

recently. In this respect it differs radically from the situation with reference to freight and passenger cars in which, at the present time, there exists a highly satisfactory buying movement which promises to continue.

In no month during the past year was locomotive buying particularly heavy. The best month of the year was March, in which month orders for 283 locomotives were reported, and the next best was October, in which month

tive utilization. This may be the explanation of the failure of locomotive purchases in 1924 to be commensurate with the volume of other railway purchases. Possibly the balance will be restored in 1925, and resort had to purchases of new power needed now less to increase merely the total amount of tractive effort, but desired rather because of the possibility of securing more effective motive power units in place of much of the older and less efficient power still remaining in service.

The Car Service Division reports each month the number of locomotives installed and retired on the Class I roads. For the year 1923 these reports showed that there were installed 4,037 locomotives, and that there were retired 3,672. The latest report for 1924 to date is that for October. In the first ten months of 1924, installations totaled 1,770—indicating a figure for the year less than half the total for 1923—while retirements for the ten months totaled 1,581. On November 1, 1924, orders on hand totaled only 358, representing at the October rate of production about three months' manufacturing activity ahead.

The locomotive orders which are listed in the accompanying tables are compiled from official sources. Details are shown this year in the same manner as they were shown last year, as to purchaser, type, service, weight, cylinders, and builder. Mention is made as to whether or not the respective locomotives will be equipped with mechanical stokers, feed water heaters, boosters and thermic syphons. In those cases where neither the notation "Yes" or "No" appears, the data was not included by the company reporting. In all cases, proper notation is made of any orders for three-cylinder locomotives, which this year have come into sudden prominence.

In the lists some few omissions of small unimportant orders doubtless occur. The details presented were supplied by the railways and other purchasers of locomotives in response to inquiries from the *Railway Age*. They were checked against similar lists furnished through the co-operation of the builders, and amplified by reference to the weekly reports in the Equipment and Supplies column of the *Railway Age*. Because of the short time available for the compilation, and the haste necessary to insure publication so close after the end of the year, the *Railway Age* does not desire to make any claims as to the scientific statistical accuracy of the tabulations or totals drawn from them. However, the real purpose of the statistics is to allow comparisons of the year's business with that of other years, which purpose it is hoped they meet with entire adequacy.

TABLE III—LOCOMOTIVES BUILT IN 1924†

Domestic (United States, 1,726; Canada, 84).....	1,810
Foreign	226
Total	2,036

Comparison with Previous Years							
Year	Domestic	Foreign	Total	Year	Domestic	Foreign	Total
1896.....	866	309	1,176	1910*.....	4,441	314	4,755
1897.....	865	386	1,251	1911*.....	3,143	387	3,530
1898.....	1,321	554	1,875	1912*.....	4,403	512	4,915
1899.....	1,951	514	2,475	1913*.....	4,561	711	5,232
1900.....	2,648	505	3,153	1914*.....	1,962	273	2,235
1901.....	.....	.....	3,384	1915*.....	1,250	835	2,035
1902.....	.....	.....	4,070	1916*.....	2,708	1,367	4,075
1903.....	.....	.....	5,152	1917*.....	2,585	2,861	5,446
1904.....	.....	.....	3,441	1918*.....	3,668	2,807	6,475
1905*.....	4,896	595	5,491	1919*.....	2,162	1,110	3,272
1906*.....	6,232	720	6,952	1920*.....	2,022	1,650	3,672
1907*.....	6,564	798	7,362	1921*.....	1,185	638	1,823
1908*.....	1,886	456	2,342	1922*.....	1,303	231	1,534
1909*.....	2,596	291	2,887	1923*.....	3,505	280	3,795
				1924†.....	1,810	226	2,036

*Includes Canadian output.

†Includes Canadian output and equipment built in railroad shops.

orders totaled 135. Orders in June totaled one only, and in August only eight. It is not difficult to understand the reason for the small locomotive purchases during the summer months because traffic was not heavy, and there was a tendency towards hesitancy in business of all kinds. It is less easy to explain the failure of the locomotive market to appear more prosperous since the presidential election. The market has been graced with favorable prices, and the relatively small number of orders on the builders' books has been a guarantee of prompt deliveries, notwithstanding which orders have not come forth in at all large quantities.

The railways handled in October the largest amount of business as shown in net ton-miles that they ever handled in a similar period of time. This heavy traffic was moved without car shortage; in fact, at the time there was a surplus of over 90,000 cars. On October 15, furthermore, there were on hand 4,950 locomotives stored in serviceable condition, thereby indicating the results of the buying program of 1922, followed by the ambitious repair program of 1923, as well as the results of better loco-

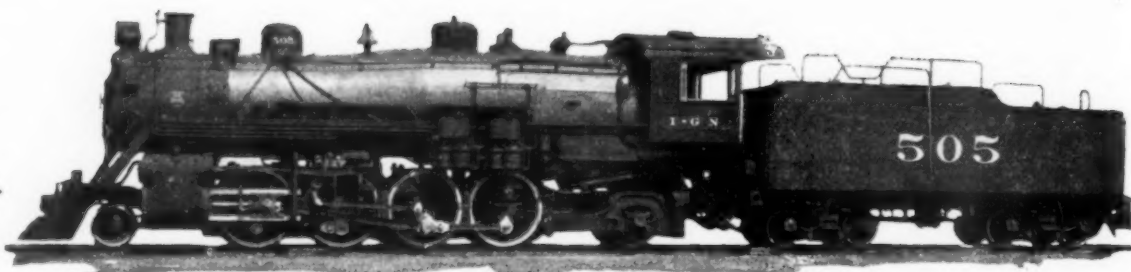
Locomotive Orders in 1924

For Service in the United States.

Purchaser	No.	Type	Service	Weight	Cylinders	Mech. Stoker	Feed Water Heater	Booster	Syphon	Builder
Alabama & Vicksburg.....	1	0-10-0	Sw.	320,000	30 x 32	No	No	No	No	Baldwin
	2	2-8-2	Frt.	222,210	22 x 28	.....	.....	.....	Yes	Baldwin
Allison Lumber Co.....	1	2-8-2	Log.	125,530	17 x 24	.....	.....	.....	.....	Baldwin
Angelina County Lumber Co.....	1	2-8-2	Log.	123,260	19 x 24	.....	.....	.....	.....	Baldwin
Atchison, Top. & Santa Fe.....	10	4-6-2	Pass.	312,000	25 x 28	No	Yes	No	No	Baldwin
	6	4-8-2	Pass.	361,600	28 x 28	No	Yes	No	No	Baldwin
	8	2-10-2	Frt.	409,500	30 x 32	No	Yes	Yes	No	Baldwin
	7	2-10-2	Frt.	400,490	30 x 32	No	Yes	No	No	Baldwin
	26	2-8-2	Frt.	343,200	27 x 32	Yes	Yes	No	No	Baldwin
	1	0-6-0	Sw.	171,790	30 x 24	Fireless	.....	.....	.....	Baldwin
Atl. & West Pt., W. Ry. of Ala....	2	4-6-0	Pass.	204,800	22 x 28	No	No	No	No	W. of Ala. Shops
	1	4-6-0	Pass.	183,000	21 x 26	No	No	No	No	W. of Ala. Shops
Atlantic Coast Line.....	20	4-6-2	Pass. & Frt	280,610	25 x 28	No	No	No	No	Baldwin
	5	0-8-0	Sw.	215,300	25 x 28	No	No	No	No	Baldwin
Bangor & Aroostook.....	4	2-8-0	Frt.	214,000	23 x 30	No	No	No	No	American
Batson & Hatten Lbr. Co.....	1	2-8-0	Frt.	187,000	22 x 28	.....	.....	.....	.....	Baldwin
Bennett Mine	1	0-6-0	Sw.	.....	.....	.....	.....	.....	.....	Lima
Benwood & Wheeling Conn.....	2	0-6-0	Sw.	165,000	22 x 28	.....	.....	.....	.....	Baldwin
Bessemer Limestone Co.....	2	Geared	.....	72,000	.....	.....	.....	.....	.....	Heisler
Bethlehem Steel Co., Inc.....	2	0-6-0	Sw.	150,000	20 x 24	.....	.....	.....	.....	Baldwin

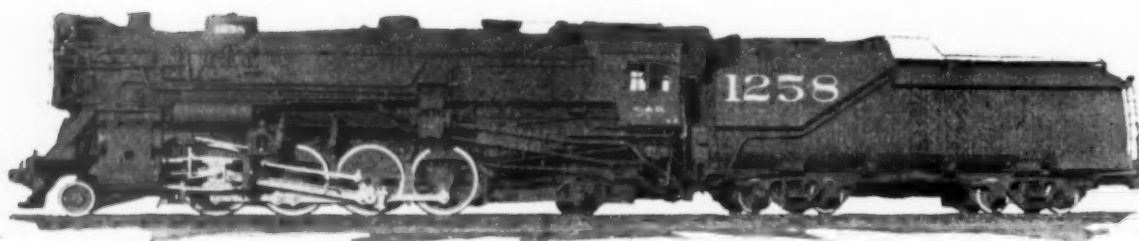
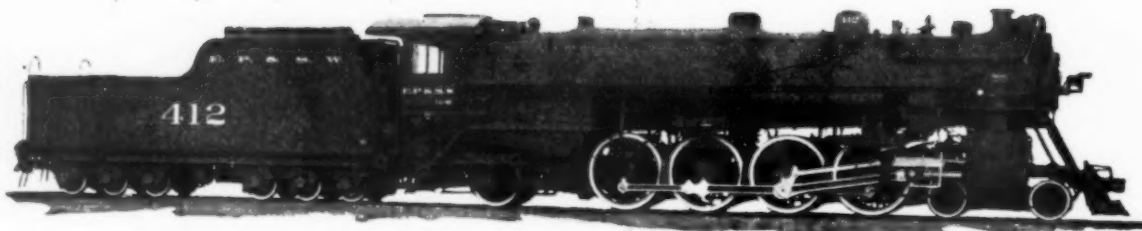
Purchaser	No.	Type	Service	Weight	Cylinders	Mech. Stoker	Feed Water Heater	Booster	Syphon	Builder
Bissell Lumber Co.....	1	Geared	.....	56,000	.....	.....	.....	.....	.....	Hei ler
Bloedel-Donovan Lbr. Mills.....	2	2-6-6-2	Log.	212,500	17 & 26 x 24	.....	.....	.....	.....	Baldwin
Boston & Albany.....	4	0-8-0	Sw.	218,000	23 1/2 x 30	.....	.....	.....	.....	American
.....	5	4-6-2	.....	306,000	26 x 28	.....	.....	.....	.....	American
Bradley Lumber & Mfg. Co.....	1	2-6-2	.....	62,000	12 x 18	.....	.....	.....	.....	American
Bridgton & Saco River.....	1	Forney	.....	.....	.....	.....	.....	.....	.....	Baldwin
Caddo River Lumber Co.....	1	2-6-2	Log.	125,000	17 x 24	.....	.....	.....	.....	Baldwin
California Fruit Exchange.....	1	2-6-2	Frt.	111,380	15 x 24	.....	.....	.....	.....	Baldwin
Carnegie Steel Co.....	3	.....	Sw.	.....	.....	.....	.....	.....	.....	.....
Carney, W. M., Mill Co.....	1	Geared	.....	100,000	.....	.....	.....	.....	.....	Heisler
Caspar Lumber Co.....	1	2-6-6-2	Log.	134,390	13 & 20 x 20	.....	.....	.....	.....	Baldwin
Central of Georgia.....	10	2-8-2	Frt.	300,500	27 x 30	No	No	No	Yes	Baldwin
Central of New Jersey.....	10	2-8-2	Frt.	.....	27 x 32	Yes	Yes	.....	.....	Baldwin
.....	10	2-8-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Vermont.....	*2	Tenders	.....	.....	.....	.....	.....	.....	.....	American
Charcoal Iron Co. of Am.....	1	2-6-0	.....	.....	.....	.....	.....	.....	.....	Baldwin
Chesapeake & Ohio.....	50	2-8-2	Frt.	355,000	28 x 32	Yes	Yes	No	No	American
.....	50	2-8-2	Frt.	358,000	28 x 30	Yes	Yes	Yes	No	American
Chicago Great Western.....	1	0-6-0	Sw.	50,000	Gasoline	.....	.....	.....	.....	Baldwin
Chicago Heights Term. Trans.....	1	0-6-0	Sw.	164,900	22 x 26	.....	.....	.....	.....	Baldwin
Chicago, Indianapolis & Louisville.....	2	4-8-0	Sw.	196,000	21 x 26	No	No	No	No	Company Shops
.....	1	4-4-0	Pass.	139,000	19 x 24	No	No	No	No	Company Shops
Chicago River & Indiana.....	5	0-8-0	Sw.	219,000	25 x 28	No	Yes	No	No	Lima
Chicago, R. I., & Pac.....	10	4-8-2	Pass.	369,000	28 x 28	No	Yes	No	Yes	American
.....	1	4-6-2	Pass.	305,000	22 1/2 x 28 (3 cyl.)	No	No	No	Yes	American
Chicago, West Pullman & Southern	1	0-6-0	Sw.	164,600	22 x 26	.....	.....	.....	.....	Baldwin
Cinn., Indianapolis & Western.....	4	4-6-2	Pass.	242,000	23 x 28	No	No	No	No	American
Cincinnati, New Orleans & Tex. Pac.	5	4-6-2	Pass.	299,000	27 x 28	Yes	Yes	No	No	American
Clarendon & Pittsford.....	1	0-6-0	.....	173,000	21 x 28	.....	.....	.....	.....	American
Clear Lake Lbr. Co.....	1	Shay	.....	.....	.....	.....	.....	.....	.....	Lima
Clev., Cinn., Chic. & St. Louis.....	20	0-8-0	Sw.	216,500	25 x 28	No	No	No	No	Lima
.....	25	2-8-2	Frt.	334,500	28 x 30	Yes	Yes	Yes	No	Lima
.....	5	4-6-2	Pass.	297,000	24 x 36	No	Yes	Yes	No	American
Clover Valley Lumber Co.....	1	2-6-6-2	Log.	221,070	17 & 26 x 24	.....	.....	.....	.....	Baldwin
Commonwealth Steel Co.....	1	0-6-0	Sw.	160,000	21 x 26	.....	.....	.....	.....	Baldwin
Cornwall.....	1	4-4-0	Pass.	150,000	20 x 24	No	No	.....	.....	Baldwin
Deep River Logging Co.....	1	2-8-2	.....	165,000	18 x 24	.....	.....	.....	.....	American
Delaware, Lackawanna & Western..	2	4-8-2	Pass.	392,000	25 x 28 (3 cyl.)	Yes	No	No	No	American
Detroit & Toledo Shore Line.....	2	0-8-0	Sw.	182,000	22 x 28	No	No	No	No	Baldwin
.....	3	2-8-2	Frt.	277,100	26 x 30	Yes	Yes	No	No	Baldwin
Detroit-Edison Co.....	1	0-6-0	Sw.	140,970	21 x 26	.....	.....	.....	.....	Baldwin
Detroit Terminal.....	2	0-6-0	.....	173,000	21 x 28	.....	.....	.....	.....	American
.....	2	0-8-0	.....	239,000	25 x 30	.....	.....	.....	.....	American
Detroit, Toledo & Ironton.....	6	0-8-0	Sw.	219,000	25 x 28	No	No	No	No	Lima
Diamond & Caldor Ry.....	1	Shay	.....	120,000	.....	.....	.....	.....	.....	Lima
Donner, Hanna Coke Corp.....	1	0-6-0	Sw.	148,000	21 x 26	No	No	No	No	American
Duluth, South Shore & Atlantic....	2	4-6-2	Pass.	202,000	21 x 26	No	No	No	No	American
.....	2	2-8-0	Frt.	187,000	21 x 28	No	No	No	No	American
Eagle Lake Spruce Mills Co.....	1	Geared	.....	84,000	.....	.....	.....	.....	.....	Heisler
El Paso & So. Western.....	6	4-8-2	.....	385,000	29 x 30	.....	.....	.....	.....	American
Erie.....	1	4-6-2	Pass.	308,000	27 x 28	Yes	No	No	Yes	Baldwin
.....	1	2-8-2	Frt.	342,000	28 x 32	Yes	Yes	Yes	Yes	Baldwin
Ewauna Box Co.....	1	2-8-2	.....	165,000	18 x 24	.....	.....	.....	.....	American
Florida East Coast.....	18	4-8-2	Pass. & Frt.	308,000	26 x 28	No	No	No	Yes	American
.....	2	4-8-2	Pass. & Frt.	308,000	26 x 28	No	Yes	No	Yes	American
.....	5	0-8-0	Sw.	215,000	25 x 28	No	No	No	Yes	American
.....	12	4-8-2	.....	.....	.....	.....	.....	.....	.....	American
.....	6	0-8-0	Sw.	.....	.....	.....	.....	.....	.....	American
Gary Tube Co.....	2	0-6-0	Sw.	164,500	22 x 28	.....	.....	.....	.....	Baldwin
Gary, W. W., Lbr. Co.....	1	Geared	.....	64,000	.....	.....	.....	.....	.....	Heisler
General Refractories Co.....	1	0-6-0	Sw.	53,000	12 x 18	.....	.....	.....	.....	Baldwin
Georgia.....	2	0-6-0	Sw.	127,200	19 x 24	No	No	No	No	Company Shops
Georgia, Florida & Alabama.....	2	2-10-0	Frt.	212,000	24 x 28	No	No	No	No	Baldwin
Grand Ronde Lbr. Co.....	1	Geared	.....	100,000	.....	.....	.....	.....	.....	Heisler
Grand Trunk Lines in U. S.....	15	0-8-0	Sw.	211,000	22 x 28	No	No	No	No	American
Great Western.....	1	2-10-0	Frt.	190,000	24 x 28	No	No	No	No	Baldwin
Green Bay & Western.....	1	2-6-0	Frt.	151,000	20 x 26	No	Yes	No	Yes	American
Greenleaf Lbr. Co.....	1	Geared	.....	100,000	.....	.....	.....	.....	.....	Heisler
Greenwood Logging Co.....	1	Geared	.....	160,000	.....	.....	.....	.....	.....	Heisler
Great Northern.....	4	2-8-8-2	Frt.	578,000	28 & 28 x 32	No	Yes	No	No	Baldwin
Hainesport Mining & Trans. Co..	1	0-6-0	Sw.	136,000	20 x 26	.....	.....	.....	.....	Baldwin
Harbeson, W. B.....	1	2-6-2	Log.	92,200	15 x 24	.....	.....	.....	.....	Baldwin
High Point, Thomasville & Denton..	1	2-8-0	.....	137,000	19 x 26	.....	.....	.....	.....	American
Homewood Timber Co.....	1	Geared	.....	72,000	.....	.....	.....	.....	.....	Heisler
Honolulu Iron Works.....	1	2-6-0	.....	54,000	13 x 18	.....	.....	.....	.....	American
Hydraulic Press Brick Co.....	1	0-4-0	Sw.	27,000	9 x 14	.....	.....	.....	.....	Baldwin
Illinois Central.....	25	4-8-2	Pass.	362,500	28 x 28	Yes	No	No	Yes	Lima
.....	25	2-8-2	Frt.	300,500	27 x 30	No	No	No	Yes	Lima
Indiana Harbor Belt.....	5	2-8-2	Frt.	305,500	25 x 32	No	Yes	Yes	No	Lima
.....	5	0-8-2	Sw.	223,500	25 x 28	No	Yes	No	No	Lima
International-Grt. Northern.....	6	2-8-2	Frt.	275,000	25 x 30	Oil	No	No	No	Baldwin
Jefferson Southwestern.....	1	2-8-0	.....	163,000	21 x 28	.....	.....	.....	.....	American
Knox Railroad.....	1	2-6-2	.....	112,000	16 x 24	.....	.....	.....	.....	American
Lehigh Valley.....	6	4-8-2	Frt. & Pass.	369,000	25 x 28 (3 cyl.)	Yes	No	No	No	American
.....	*20	Tenders	.....	.....	.....	.....	.....	.....	.....	American
Lincoln Sand & Gravel Co.....	1	0-6-0	Sw.	102,050	16 x 24	.....	.....	.....	.....	Baldwin
Long Bell Lumber Co.....	2	2-8-2	.....	165,000	18 x 24	.....	.....	.....	.....	American
Long Island.....	5	4-6-0	Pass. & Frt.	237,000	24 x 28	No	No	No	No	Penn. R. R.
Los Angeles & Salt Lake.....	5	4-8-2	Pass.	340,000	29 x 28	Oil	No	No	No	American
.....	10	2-10-2	Frt.	367,000	29 1/2 x 30	Oil	No	No	No	Baldwin
Louisiana & Arkansas.....	2	2-8-2	Frt.	259,000	24 x 28	Oil	No	Yes	No	Baldwin

International-
Great Northern
Mikado.
Tractive Force,
58,500 lb.
Built by Baldwin.



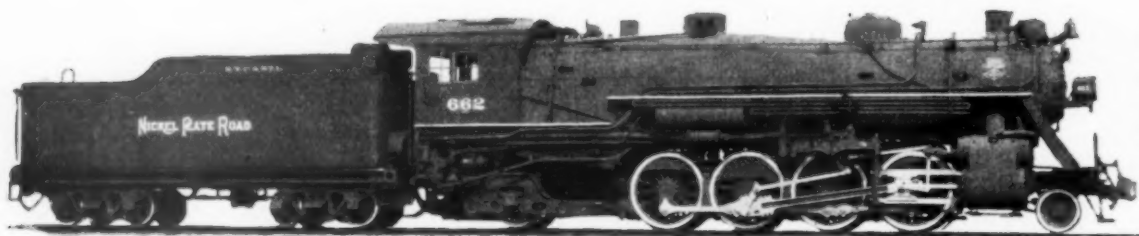
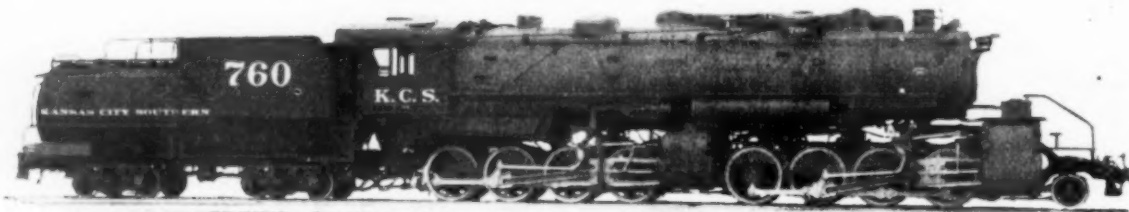
Atchison, Topeka
& Santa Fe
Mountain Type.
Tractive Force,
54,100 lb.
Built by Baldwin.

El Paso & South-
western Mountain
Type.
Tractive Force,
61,300 lb.
Built by
American.



Chesapeake &
Ohio Mikado.
Tractive Force,
67,700 lb.
Built by
American.

Kansas City
Southern Mallet.
Tractive Force,
132,500 lb. Simple,
110,400 lb.
Compound.
Built by
American.



Nickel Plate
Mikado.
Tractive Force,
54,700 lb.
With Booster,
65,900 lb.
Built by Lima.

Some of the Interesting Locomotive Orders of 1924

Purchaser	No.	Type	Service	Weight	Cylinders	Mech. Stoker	Feed Water Heater	Booster	Syphon	Builder
Louisville & Nashville.....	6	4-6-2	Pass.	277,000	25 x 28	No	No	No	No	American
	6	0-8-0	Sw.	214,000	25 x 28	No	No	No	No	American
	17	2-8-2	Fr.	320,000	27 x 32	Yes	No	No	No	American
	1	2-8-2	Fr.	334,000	23 x 28 & 32 (3)	Yes	No	No	No	American
	8	2-8-2	Fr.	322,000	27 x 32	.....	.....	.....	.....	American
	8	0-8-0	Sw.	217,000	25 x 28	.....	.....	.....	.....	American
	8	2-8-2	.....	324,000	27 x 32	.....	.....	.....	.....	American
Maine Central.....	2	4-6-2	Pass.	272,000	25 x 28	No	No	Yes	No	American
	6	2-8-2	Fr.	298,000	26½ x 30	Yes	Yes	Yes	No	American
Manary Logging Co.....	1	2-6-2	Log.	122,000	17 x 24	.....	.....	.....	.....	Baldwin
Maryland & Delaware Coast.....	1	2-8-0	Fr.	121,900	18 x 24	.....	.....	.....	.....	Baldwin
M'Cloud River.....	2	2-6-2	Fr.	180,000	17 x 24	No	Yes	No	No	Baldwin
Michigan Central.....	5	0-8-0	Sw.	219,500	25 x 28	No	No	No	No	American
	15	0-8-0	Sw.	223,500	25 x 28	No	No	No	No	Lima
	5	2-8-2	Fr.	334,500	28 x 30	Yes	Yes	Yes	No	Lima
	5	4-6-2	Pass.	303,000	24 x 28	No	.....	No	No	American
Missouri-Kansas-Texas.....	10	0-8-0	Sw.	248,000	26 x 26	Oil	No	No	No	Lima
Missouri Pacific.....	9	4-6-2	Pass.	290,000	27 x 28	No	No	No	Yes	American
	1	4-6-2	Pass.	302,500	22½ x 28 (3 cyl.)	No	No	No	Yes	American
	11	2-8-2	Fr.	333,000	27 x 32	Yes	No	No	Yes	American
	13	2-8-2	Fr.	333,000	27 x 32	Yes	No	Yes	Yes	American
	1	2-8-2	Fr.	334,000	23x28 & 32 (3 cyl.)	Yes	No	No	Yes	American
	15	0-8-0	Sw.	214,000	25 x 28	No	No	No	Yes	Baldwin
	10	4-6-2	.....	290,000	27 x 28	.....	.....	.....	.....	American
	35	2-8-2	.....	330,000	27 x 32	.....	.....	.....	.....	American
	5	0-8-0	Sw.	224,490	25 x 28	.....	.....	.....	Yes	Baldwin
Mobile & Ohio.....	1	4-6-2	Pass.	274,600	25 x 28	No	No	No	No	Baldwin
	4	2-8-2	Fr.	290,000	26 x 30	No	No	No	No	Lima
Montana, Wyoming & Southern.....	1	2-8-2	Fr.	208,000	22 x 28	No	No	No	No	Baldwin
Mud Bay Logging Co.....	1	Geared	.....	110,000	.....	.....	.....	.....	.....	Heisler
Natchez, Columbia & Mobile.....	1	2-8-2	.....	173,000	20 x 28	.....	.....	.....	.....	American
Nevada Consol. Copper Co.....	2	0-6-2	.....	165,000	19 x 26	.....	.....	.....	.....	American
New England Fuel & Trans. Co.....	1	0-8-0	Sw.	200,000	23 x 28	.....	.....	.....	.....	Baldwin
New York Central.....	25	0-8-0	Sw.	219,000	25 x 28	.....	.....	.....	.....	American
	50	2-8-2	Fr.	337,000	28 x 30	Yes	Yes	Yes	.....	American
	20	0-8-0	Sw.	219,000	25 x 28	.....	.....	.....	.....	American
	7	0-8-0	Sw.	219,000	25 x 28	.....	.....	.....	.....	Lima
	2	Electric	Sw.	.....	.....	.....	.....	.....	.....	General Electric
	35	Electric	Fr.	.....	.....	.....	.....	.....	.....	General Electric
	15	Tenders	.....	.....	.....	.....	.....	.....	.....	American
N. Y., Chicago & St. Louis.....	10	2-8-2	Fr.	317,500	26 x 30	Yes	Yes	Yes	No	Lima
	10	0-8-0	Sw.	216,500	25 x 28	No	No	No	No	Lima
N. Y., N. H. & Hartford.....	10	0-8-0	Sw.	245,000	22 x 28 (3 cyl.)	.....	.....	.....	.....	American
	2	Elec. 0-4-4-0	Sw.	120,000	11,000 volts with D. C. Motors	.....	.....	.....	.....	Am.-Gen. Elec.
	5	Elec. 2-6-6-2	Fr.	.....	11,000 volts with D. C. Motors	.....	.....	.....	.....	Am.-Gen. Elec.
	2	Elec. 0-4-4-0	Sw.	120,000	600 volts with D. C. Motors	.....	.....	.....	.....	West'house Electric
Norfolk & Western.....	*10	Tenders	.....	.....	.....	.....	.....	.....	.....	American
Northern Pacific Term.....	1	0-6-0	.....	168,000	21 x 26	.....	.....	.....	.....	American
Oakhurst Lumber Co.....	1	2-8-2	Log.	129,000	17 x 24	.....	.....	.....	.....	Baldwin
Oregon-American Lumber Co.....	1	2-6-2	Log.	126,000	18 x 24	.....	.....	.....	.....	Baldwin
	1	2-6-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Owen-Oregon Lumber Co.....	1	2-8-2	Log.	120,900	19 x 24	.....	.....	.....	.....	Baldwin
Pacific Electric.....	5	Electric	.....	.....	.....	.....	.....	.....	.....	Company Shops
Pacific Gas & Electric Co.....	1	Shay	.....	140,000	.....	.....	.....	.....	.....	Lima
Pacific States Lbr. Co.....	1	Shay	.....	180,000	.....	.....	.....	.....	.....	Lima
Pennsylvania.....	50	4-6-2	Pass.	308,890	27 x 28	No	No	No	No	Altoona Wks.
	50	4-6-0	Pass.	237,000	24 x 28	No	No	No	No	Altoona Wks.
	1	Elec. 2-8-2	Sw.	240,000	11,000 volts A. C.	.....	.....	.....	.....	Alt. Wks.-West.
	50	0-8-0	Sw.	275,000	27 x 30	No	No	No	No	Altoona Wks.
Penn. Seaboard Steel Corp.....	1	0-4-0	Sw.	96,770	16 x 24	.....	.....	.....	.....	Baldwin
Penrod, Jurden Co.....	1	Geared	.....	64,000	.....	.....	.....	.....	.....	Heisler
Peoria & Pekin Union.....	3	0-8-0	Sw.	220,000	25 x 28	.....	.....	.....	.....	Baldwin
Philadelphia Electric Co.....	1	0-4-0	Sw.	98,500	16 x 24	.....	.....	.....	.....	Baldwin
Philadelphia Slag Co.....	1	0-6-0	Sw.	123,670	19 x 24	.....	.....	.....	.....	Baldwin
Pickands, Mather & Co.....	6	0-6-0	.....	161,000	21 x 26	.....	.....	.....	.....	American
	1	0-6-0	Sw.	158,000	21 x 26	No	No	No	No	Lima
	1	0-6-0	Sw.	139,500	19 x 26	No	No	No	No	Lima
Pittsburgh & Lake Erie.....	11	2-8-2	Fr.	337,000	28 x 30	Yes	Yes	Yes	No	American
	*10	Tenders	.....	.....	.....	.....	.....	.....	.....	Lima
Pittsburgh & W. Va.....	1	4-6-2	Pass.	192,000	20 x 26	No	No	No	No	American
Pittsburgh, Lisbon & Western.....	1	2-8-0	Fr.	146,000	20 x 25	.....	.....	.....	.....	Baldwin
Pittsburgh Plate Glass Co.....	1	0-6-0	.....	136,000	19 x 24	.....	.....	.....	.....	American
Ostrander Ry. & Timber Co.....	1	Geared	.....	160,000	.....	.....	.....	.....	.....	Heisler
Quincy Railroad.....	1	2-6-2	.....	107,000	16 x 24	.....	.....	.....	.....	American
Reading Company.....	5	4-6-2	Pass.	273,600	25 x 28	No	No	No	No	Baldwin
	25	2-8-0	.....	.....	.....	.....	.....	.....	.....	Baldwin
	5	4-6-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
	5	0-8-0	Sw.	280,610	26 x 32	No	No	No	No	Baldwin
Reliance Rock Co.....	1	0-6-0	.....	123,000	17 x 24	.....	.....	.....	.....	American
San Antonio & Aransas Pass.....	5	4-4-0	Pass.	65,000	17 x 24	No	No	No	No	Baldwin
Schafer Bros. Logging Co.....	1	2-6-2	Log.	154,000	18 x 24	.....	.....	.....	.....	Baldwin
Seaboard Air Line.....	20	2-8-2	Fr.	301,000	26 x 30	Yes	.....	Yes	.....	Baldwin
	10	2-8-2	Pass.	320,900	27 x 28	.....	.....	.....	.....	Baldwin
	1	2-8-2	Log.	182,760	20½ x 28	.....	.....	.....	.....	Baldwin
Shevlin-Hixon Co.....	1	2-8-2	Log.	152,480	19 x 24	.....	.....	.....	.....	Baldwin
Siler Logging Co.....	1	2-8-2	Log.	118,600	19 x 24	.....	.....	.....	.....	Baldwin
Sioux City Terminal Ry.....	1	0-6-0	Sw.	118,600	19 x 24	.....	.....	.....	.....	Baldwin
Snow Storm Silver Lead Co.....	1	Geared	.....	56,000	.....	.....	.....	.....	.....	Heisler
Southern Railway.....	25	2-8-2	Fr.	326,000	27 x 32	Yes	Yes	No	No	American
	15	4-6-2	Pass.	299,000	27 x 28	Yes	Yes	No	No	American
	10	0-8-0	Sw.	214,000	25 x 28	No	No	No	No	American
	20	0-8-0	Sw.	214,000	25 x 28	No	No	No	No	American
	5	2-8-8-2	Fr.	450,000	25 & 39 x 30	Yes	No	No	No	Baldwin
Southern Pacific.....	1	2-10-2	Fr.	398,000	29½ x 32	.....	Yes	Yes	.....	Baldwin
	1	4-10-2	.....	438,000	25x28 & 32 (3)	.....	.....	.....	.....	American
	15	4-10-2	.....	438,000	25x28 & 32 (3)	.....	.....	.....	.....	American
Speer Harris Lbr. Co.....	1	Geared	.....	64,000	.....	.....	.....	.....	.....	Heisler
Standard Oil Co. (Indiana).....	2	0-6-0	.....	161,000	21 x 26	.....	.....	.....	.....	American

Purchaser	No.	Type	Service	Weight	Cylinders	Mech. Stoker	Feed Water Heater	Booster	Syphon	Builder
Standard Oil Co. (N. J.).....	1	0-6-0	Sw.	148,110	21 x 26	.....	.....	.....	.....	Baldwin
Sugar Pine Lumber Co.....	1	2-6-2	.....	199,000	20 x 24	.....	.....	.....	.....	American
Tatum Lumber Co.....	1	2-8-2	Log.	160,730	19 x 26	.....	.....	.....	.....	Baldwin
Tendal Lbr. Co.....	1	Geared	.....	48,000	.....	.....	.....	.....	.....	Heisler
Tennessee, Ala. & Georgia.....	1	2-8-0	Frts.	147,000	20 x 26	.....	.....	.....	.....	Baldwin
Terminal R. R. Assn., of St. Louis..	15	0-8-0	Sw.	248,000	26 x 28	.....	.....	.....	.....	Baldwin
Texas-Gulf Sulphur Co.....	1	.....	.....	.....	.....	.....	.....	.....	.....	American
Texas-Mexican	1	4-6-0	Frts.	158,000	20 x 26	No	No	No	No	Baldwin
Thomsen, Clark Lbr. Co.....	1	2-6-2	Log.	120,500	17 x 24	.....	.....	.....	.....	Baldwin
Toledo Furnace Co.....	1	0-6-0	Sw.	135,300	19 x 26	No	.....	No	.....	Lima
Tuskegee R. R.....	1	2-6-2	Frts.	121,100	17 x 24	.....	.....	.....	.....	Baldwin
Union	2	0-6-0	.....	162,000	21 x 26	.....	.....	.....	.....	American
Union Pacific	19	2-8-8-0	Frts.	495,500	26 & 41 x 32	Yes	No	No	Yes	American
.....	1	2-8-8-0	Frts.	495,500	26 & 41 x 32	Yes	Yes	No	Yes	American
United States Gypsum Co.....	2	.....	Sw.	.....	.....	.....	.....	.....	.....	American
United States War Dept.....	1	2-6-0	Nor. Ga. Frts. & Sw.	82,000	16 x 20	No	No	No	No	Baldwin
Utah Copper Co.....	1	0-8-0	.....	220,000	25 x 28	.....	.....	.....	.....	American
.....	3	0-6-0	Sw.	157,500	21 x 24	.....	.....	.....	.....	Baldwin
Vacuum Oil Co.....	1	0-6-0	.....	158,000	21 x 26	.....	.....	.....	.....	American
Wabash	1	0-8-0	.....	.....	.....	.....	.....	.....	.....	American
.....	5	2-8-2	Frts.	351,000	23 x 28 & 32 (3)	Yes	No	No	No	American
.....	20	2-8-2	Frts.	329,000	27 x 32	Yes	No	Yes	Yes	American
.....	15	2-8-2	Frts.	318,900	27 x 32	Yes	No	Yes	No	American
.....	10	2-8-2	Frts.	318,900	27 x 32	Yes	Yes	No	No	American
Warren, S. D., Co.....	1	0-6-0	.....	108,000	18 x 24	.....	.....	.....	.....	American
Wash. Brandywine & Ft. Lookout..	1	2-6-0	Pass. & Frts.	85,780	15 x 20	.....	.....	.....	.....	Baldwin
Western Pacific	5	2-8-2	Frts.	327,000	28 x 30	No	No	Yes	No	American
.....	5	2-6-6-2	Frts.	429,500	23 1/2 & 37 x 32	No	No	No	No	American
Westinghouse Electric & Mfg. Co..	1	2-6-0	Sw.	179,340	23 x 26	.....	.....	.....	.....	Baldwin
Wheeling Steel Corp.....	1	0-6-0	Sw.	135,000	20 x 26	.....	.....	.....	.....	Baldwin
Winlock, Toledo R.R. & Log Co....	1	2-8-2	.....	165,000	18 x 24	.....	.....	.....	.....	American
Yosemite Valley	1	2-6-0	Pass. & Frts.	180,000	19 x 28	Oil	Yes	No	No	American
Canada										
Canadian National	15	4-8-2	Pass.	339,950	26 x 30	Yes	Yes	No	No	Canadian
.....	6	4-8-2	Pass.	339,000	26 x 30	Yes	Yes	No	No	Canadian
.....	5	2-10-2	Frts.	409,240	29 x 32	Yes	Yes	Yes	No	Canadian
.....	20	2-8-2	Frts.	324,600	27 x 30	Yes	Yes	Yes	No	Montreal
.....	10	2-8-2	Frts.	323,600	27 x 30	Yes	Yes	Yes	No	Montreal
Canadian Pacific	15	2-8-2	Frts.	321,400	25 1/2 x 32	No	No	No	No	Montreal
.....	*10	Tenders	.....	.....	.....	.....	.....	.....	.....	Canadian
Mexico										
National Railways of Mexico.....	10	2-8-2	Frts.	262,260	25 x 30	.....	.....	.....	.....	Baldwin
.....	15	2-8-0	Frts.	172,590	21 x 28	.....	.....	.....	.....	Baldwin
.....	2	2-8-0	Frts.	159,240	20 x 26	.....	.....	.....	.....	Baldwin
.....	8	2-8-0	Frts.	115,200	18 x 22	.....	.....	.....	.....	Baldwin
.....	10	4-6-0	Pass.	90,400	17 x 20	.....	.....	.....	.....	Baldwin
.....	4	4-6-2	Pass.	253,950	25 x 28	.....	.....	.....	.....	Baldwin
.....	1	4-8-0	Pass.	276,950	28 x 28	.....	Yes	.....	.....	Baldwin
Other Export										
Atkin, E., & Co. (Cuba).....	2	2-8-2	.....	216,000	22 x 28	.....	.....	.....	.....	American
Bikaner State Rys. (India).....	5	2-8-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Catton-Neill Engr. & Machy. Corp (P. Is.)	6	2-6-0	.....	54,000	13 x 18	.....	.....	.....	.....	American
Enyati Ry. (South Africa).....	1	2-10-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Huancayo a Ayacucho, F. C. de (Peru)	1	2-6-0	.....	.....	.....	.....	.....	.....	.....	Baldwin
Imperial Gov't. Rys. (Japan).....	2	Elec., 2-6-6-2	Pass.	184,000	1,500 volts D. C.	.....	.....	.....	.....	Baldwin-West'h'se
.....	6	Elec., 2-4-4-2	Pass.	150,000	1,500 volts D. C.	.....	.....	.....	.....	Baldwin-West'h'se
Manati Sugar Co. (Cuba).....	2	2-8-0	.....	120,000	18 x 24	.....	.....	.....	.....	American
.....	3	0-6-0	.....	94,000	15 x 22	.....	.....	.....	.....	American
Mogyana Ry. (Brazil).....	2	4-6-2	.....	113,000	17 1/2 x 20	.....	.....	.....	.....	American
.....	6	2-8-2	.....	120,000	17 1/2 x 20	.....	.....	.....	.....	American
.....	1	2-6-0	.....	54,000	13 x 18	.....	.....	.....	.....	American
Pacifico, F. C., al (Costa Rica)....	2	2-6-0	.....	.....	.....	.....	.....	.....	.....	Baldwin
Havana Central	*10	Tenders	.....	.....	.....	.....	.....	.....	.....	Baldwin
Insular Rubber Co. (P. I.).....	1	0-6-6-0	.....	.....	.....	.....	.....	.....	.....	Baldwin
Jodhpur State Rys. (India).....	5	2-8-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Kahului R.R. (Hawaii).....	1	2-8-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Lourenco Marques (Port. E. Afr.)..	2	2-8-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
.....	4	2-8-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Madras & Southern Mahratta (India)	2	2-8-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
.....	2	4-6-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Nitrate Rys. (Chile).....	6	2-8-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Pacifico, F. C., del (Colombia)....	2	2-8-2	.....	107,000	16 1/2 x 22	.....	.....	.....	.....	American
.....	2	4-8-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Paulista Ry. of Brazil.....	2	4-8-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
.....	4	2-8-2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Shinano Ry. (Japan).....	2	Elec., 0-4-4-0	Pass.	60,000	1,500 volts D. C.	.....	.....	.....	.....	West'h'se Elec.
Sorocabana, E. F. (Brazil).....	9	2-8-2	.....	126,000	19 x 20	.....	.....	.....	.....	American
Trujillo Ry. (Peru).....	2	2-8-0	.....	81,000	15 x 20	.....	.....	.....	.....	American
Ulen Contract. Co. (Bolivia).....	2	2-8-2	.....	164,000	21 x 24	.....	.....	.....	.....	American
United Fruit Co.....	1	0-6-0	Sw.	52,000	11 x 16	.....	.....	.....	.....	R. Poliakkoff
.....	2	5-ton	Gas.	10,000	5 x 7 1/2	.....	.....	.....	.....	Baldwin
West India Sugar Co. (Cuba).....	1	2-6-0	.....	.....	.....	.....	.....	.....	.....	Baldwin
Wonham, Bates & Goode.....	1	Geared	.....	48,000	.....	.....	.....	.....	.....	Heisler

*Not included in totals.



70-ton Hopper Car Built for New York Central Lines by Pressed Steel Car Company

Freight Car Purchases in 1924

*Fifty per cent in excess of 1923 total but less than in 1922—
Present buying heavy*

By F. W. Kraeger

THE freight cars ordered during 1924 for service in the United States totaled, according to compilations of the *Railway Age*, 143,728. This compared with 94,471 ordered in 1923. Orders in 1922, however, were 180,154. The 1924 total was the largest reported for any year since 1916 except 1922.

The Canadian orders for cars placed with Canadian

of the year. For much of 1924 it looked as if conditions might prove similar. Up to April 30, 1924, orders had been placed for about 70,000 cars. There were, however, practically no orders placed during the following four months. Freight car purchases reported in May, June and July together totaled only 1,355 cars, and those reported in August but 4,751 cars. Improving conditions in

TABLE I—FREIGHT CAR ORDERS IN 1924

For service in the United States	143,728
For service in Canada	1,867
For service in Mexico	1,740
For export to other countries	2,277
Grand Total	149,612

builders totaled only 1,867, as compared with 8,685 in 1923.

The National Railways of Mexico ordered from builders in the United States 1,740 cars, and other export business is tabulated to the number of 2,277 cars.

Freight car production in 1924 totaled 113,761 cars, as compared with 175,748 cars in 1923.

The freight car market at the present time is in a decidedly satisfactory condition. This results because of the continuance of the buying movement which began early in September with the purchase of 10,000 cars by the Pennsylvania. Since that order was placed orders have followed from roads in all parts of the country in sizable quantities. The market has been favored by good prices, and fortunately there has been no tendency towards a run-away buying movement which, because of its being such, might not be expected to last. The prospects for the railways in 1925 are extremely favorable, and there is every reason to believe that the freight car market will derive full advantage of this.

It was a feature of 1923 buying that some two-thirds of the business was placed during the first four months

TABLE II—ORDERS FOR FREIGHT CARS SINCE 1901

Domestic Orders			
Year	Freight cars	Year	Freight cars
1901.....	193,439	1908.....	62,669
1902.....	195,248	1909.....	189,360
1903.....	108,936	1910.....	141,024
1904.....	136,561	1911.....	133,117
1905.....	341,315	1912.....	234,758
1906.....	310,315	1913.....	146,732
1907.....	151,711	1914.....	80,264

Domestic and Foreign				
Year	Domestic	Canadian	Export	Total
1915.....	109,792	.....	18,222	128,014
1916.....	170,054	.....	35,314	205,368
1917.....	79,367	.....	53,191	132,558
1918.....	114,113	9,657	53,547	177,317
1919.....	22,062	3,837	3,994	29,893
1920.....	84,207	12,406	9,056	105,669
1921.....	23,346	30	4,982	28,358
1922.....	180,154	746	1,072	181,972
1923.....	94,471	8,685	396	105,552
1924.....	143,728	1,867	4,017	149,612

Prior to 1918, Canadian orders included in domestic.

September, and since, have changed the situation with the result that, unlike 1923, as much business was placed in the second half of the year as in the first half.

The business of the first three or four months of 1924 represented one buying movement whereas that of the last four months has represented another, with an almost absolute cessation of buying in between. The first three months of 1924 were quite prosperous. Many observers believe that the prosperity that existed at that time was due largely to railway buying, and to freight car buying

in particular. Present promising business conditions date from September when rising farm prices, and confidence as to the result of the pending presidential election, resulted in a marked improvement as compared with the summer months. It is noteworthy that the freight car market was one of the first to reflect improving conditions

of 12,000 in the spring, and another of 10,000 in September, all A. R. A. standard cars and totaling in value \$46,500,000. The Illinois Central purchased 6,200 freight cars, and its total purchases of equipment aggregated \$25,000,000. Other large purchases included the Norfolk & Western, 11,000; the Louisville & Nashville, 5,700; the Southern Railway, 8,948; the Chesapeake & Ohio, over 10,000; the Missouri Pacific, not including its subsidiary, the American Refrigerator Transit Company, over 4,000; the Reading, 4,050; the Atchison, Topeka & Santa Fe, 7,200, etc.

The list of orders which follows was compiled from information furnished to the *Railway Age* by the railroads, private car lines, and other owners of cars, in response to requests for this information. The data thus furnished was then checked against lists of orders furnished by the car builders, and amplified accordingly, and also against the weekly reports of orders appearing in the Equipment and Supplies columns of the *Railway Age*. The figures of production were secured in response to requests made to the car builders for this information. As in former years, the *Railway Age* is especially indebted to the Railway Car Manufacturers' Association in securing the reports of the members of that organization.

It will be noted that in this year's tabulation two new column heads appear, namely "Date of Order" and "Date of Delivery" in place of the former "Draft Gear" and "Trucks". It is believed that data as to deliveries will prove of greater value to the users of the tables.

The *Railway Age* is not sufficiently optimistic as to believe that the lists can include all the orders placed or that the figures of production are of scientific accuracy. It feels that such accuracy would be next to impossible in view of the short space of time permitted for the compilations due to the desirability of having the results available at the close of the year with which they deal. However, it is believed that such omissions as occur will be found to be small and unimportant, and will not vitiate the value of the figures, particularly as concerns comparison with preceding years, which, after all, is the primary purpose of the compilations.

TABLE III—FREIGHT CARS BUILT IN 1924

	United States	Canada	Total
Domestic	113,761	1,721	115,482
Foreign	1,141	.....	1,141
	114,902	1,721	116,623

Comparison with Previous Years

Year	Domestic	Foreign	Total
1899.....	117,982	1,904	119,886
1900.....	113,070	2,561	115,631
1901.....	132,591	4,359	136,950
1902.....	161,747	2,800	164,547
1903.....	153,195	1,613	154,808
1904.....	60,955	1,995	62,950
1905.....	162,701	5,305	168,006
1906.....	236,451	7,219	243,670
1907.....	280,216	9,429	289,645
1908.....	75,344	1,211	76,555
1909.....	91,077	2,493	93,570
1910.....	176,374	4,571	180,945
1911.....	68,961	3,200	72,161
1912.....	148,357	4,072	152,429

*Includes Canadian output.

†Includes Canadian output and equipment built in company shops.

	United States			Canadian			Grand Total
	Domestic	Foreign	Total	Domestic	Foreign	Total	
1913.....	176,049	9,618	185,667	22,017	.....	22,017	207,684
1914.....	97,626	462	98,088	6,453	.....	6,453	104,541
1915.....	58,226	11,916	70,142	1,758	2,212	3,970	74,112
1916.....	111,516	17,905	129,421	.....	.....	5,580	135,001
1917.....	115,705	23,938	139,643	3,658	8,100	11,758	151,401
1918.....	67,063	40,981	108,044	14,704	1,960	16,664	124,708
1919.....	94,981	61,783	156,764	6,391	30	6,421	163,185
1920.....	60,955	14,480	75,435	.....	.....	.....	.....
1921.....	40,292	6,412	46,704	8,404	745	9,149	55,853
1922.....	66,289	1,126	67,415	458	100	558	67,973
1923.....	175,748	2,418	178,166	.....	.....	.....	.....
1924.....	113,761	1,141	114,902	1,721	.....	1,721	116,623

when favorable prices and an optimistic view of the future led the Pennsylvania and the Illinois Central in particular to come into the market for large purchases.

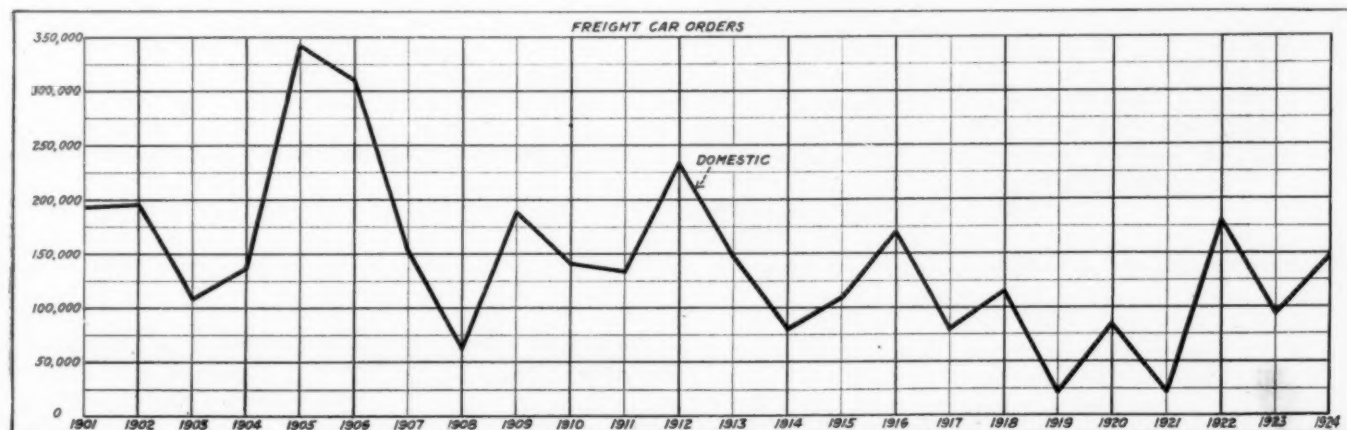
The year 1924 was characterized by some unusually large orders. The New York Central Lines purchased over 20,000 cars. The Pennsylvania purchased one lot

Freight Car Orders in 1924

For Service in the United States

Purchaser	No.	Class	Capacity	Length Ft. In.	Construction	Weight	Date of Order	Date of Delivery	Builder
Alabama Great Southern.....	250	Gondola	100,000	41 6	All Steel	40,200	March	Aug.-Sept.	Tenn., C. I. & R. R.
American Locomotive Co.....	1	Air Dump	.....	.....	.....	.....	.....	.....	Magor
Amer. Refr. Transit Co.....	750	Refrigerator	80,000	39 9 1/2	St. Und'frame	58,000	September	Start Nov.	Am. Car & Fdy.
	750	Refrigerator	80,000	39 9 1/2	St. Und'frame	58,000	September	Start Nov.	Mt. Vernon
	450	Refrigerator	80,000	39 9 1/2	St. Und'frame	58,000	September	Start Nov.	General American
American Rolling Mill Co.....	6	Gon. Bod.	100,000	36 4	All Steel	23,060	June	December	Pressed Steel
American Smelt. & Ref. Co.....	15	Gondola	100,000	36 0	All Steel	42,600	May	November	Pressed Steel
American Steel & Wire Co.....	20	Gondola	140,000	36 4	All Steel	47,000	May	September	Am. Car & Fdy.
American Tar Products Co.....	10	Tank	10,000g.	34 1	All Steel	54,100	February	May	Chic. Steel Car
Ann Arbor	250	S. S. Box	80,000	40 6	Steel Frame	35,000	January	May	Standard Tank
	250	S. S. Auto	80,000	40 6	Steel Frame	35,000	January	May	Standard Tank
Apalachicola Northern.....	18	Flat	60,000	.....	.....	.....	.....	.....	Company Shops
Atchison, Topeka & Santa Fe.....	500	Gondola	100,000	40 0	Steel Frame	47,400	February	June	Am. Car & Fdy.
	500	Gondola	100,000	40 0	Steel Frame	47,400	November	Mar., 1925	Am. Car & Fdy.
	500	Flat	80,000	44 6	St. Und'frame	36,400	February	October	Am. Car & Fdy.
	500	D. S. Auto	80,000	50 0	Steel Frame	55,000	February	September	Pullman
	500	Stock	80,000	40 0	Steel Frame	48,000	April	November	Standard Steel
	1,000	Refrigerator	70,000	39 11 1/2	St. Und'frame	56,400	February	August	Pullman
	1,000	Refrigerator	70,000	39 11 1/2	St. Und'frame	56,400	February	August	Am. Car & Fdy.
	500	Refrigerator	70,000	39 11 1/2	St. Und'frame	56,400	November	Mar., 1925	Am. Car & Fdy.
	1,000	D. S. Box	80,000	40 6	Steel Frame	46,200	February	August	Pullman
	1,000	D. S. Box	80,000	40 6	Steel Frame	46,200	February	August	Pullman
	100	Air Dump	100,000	34 0	All Steel	72,500	May	June	West. Wh. Scraper
	100	Air Dump	100,000	32 1 1/2	All Steel	58,700	April	May	Clark Car
Atl. & West. Pt.-W. Ry. of Ala....	50	Gondola	60,000	36 8	St. Und'frame	.....	.....	.....	W. of Ala. Shops
	25	Flat	60,000	36 8	All Wood	30,000	.....	.....	W. of Ala. Shops
	50	Gondola	80,000	36 8	St. Und'frame	40,000	.....	.....	W. of Ala. Shops
	100	Gondola	110,000	40 6	All Steel	42,800	July	September	Pressed Steel
Atlanta, Birm. & Atlantic Ry.....	100	S. S. Box	60,000	36 0	St. Cen. Sills	35,300	.....	.....	Company Shops
	2	Gondola	80,000	38 2	Wood	33,000	.....	.....	Company Shops
	25	Wood Racks	60,000	37 6 1/2	Wood	31,300	.....	.....	Company Shops
Atlantic Coast Line.....	30	Caboose	60,000	29 0	St. Und'frame	41,400	February	July	Company Shops
	50	Ballast	.....	.....	All Steel	.....	March	.....	Va. Bridge & Iron
Atlantic Tar & Chem. Wks., Ltd..	20	Tank	100,000	.....	All Steel	45,000	March	March	Am. Car & Fdy.
	15	Tank	100,000	.....	All Steel	45,000	November	November	Am. Car & Fdy.

Purchaser	No.	Class	Capacity	Length Ft. In.	Construction	Weight	Date of Order	Date of Delivery	Builder
Bangor & Aroostook.....	75	S. S. Box	60,000	36 0	St. Und'frame	40,300	February	June	Company Shops
	1	S. S. Box	80,000	36 0	St. Und'frame	46,000	March	June	Company Shops
	50	Flat	60,000	36 9	St. Und'frame	29,000	May	November	Company Shops
Barnsdall Refining Co.....	50	Tank	8,050g.	.....	All Steel	.....	.....	.....	Penn. Car Co.
Bell Oil & Gas Co.....	5	Tank	8,050g.	.....	All Steel	.....	.....	.....	Standard Tank
Boston & Albany.....	1,000	Box	110,000	40 6 3/4	All Steel	46,300	March	September	Am. Car & Fdy.
	25	Dump	.....	.....	.....	.....	.....	.....	West. Wh. Scraper
Braden Copper Co.....	12	Tank	4,000g.	.....	All Steel	.....	.....	.....	Gen. Amer. Tank
	12	Tank	10,000g.	.....	All Steel	.....	.....	.....	Am. Car & Fdy.
Brooks-Scanlon Corp.....	75	Logging	80,000	50 0	All Steel	42,000	April	September	Kilby Car & Fdy.
Buffalo Creek.....	1	Dump	.....	.....	.....	.....	.....	.....	Clark Car Co.
Caddo Cen. Oil & Ref. Corp.....	2	Tank	80,000	.....	St. Und'frame	.....	September	October	Standard Tank
	1	Tank	80,000	.....	St. Und'frame	.....	October	.....	Standard Tank
California Dispatch Line.....	5	Tank	8,050g.	.....	All Steel	.....	.....	.....	Penn. Car Co.
	5	Tank	10,100g.	.....	All Steel	.....	.....	.....	Penn. Car Co.
Calorie Company.....	6	Tank	60,000	28 2	All Steel	40,000	August	November	Middletown Car Co.
Carnegie Steel Co.....	30	Hopper	100,000	40 2	All Steel	51,000	May	October	Pressed Steel
	2	Flat	200,000	46 0	All Steel	62,975	October	1925	Pressed Steel
	10	Gondola	140,000	46 0	All Steel	50,540	October	1925	Pressed Steel
	9	Hop. Bods.	140,000	.....	.....	.....	May	.....	Warren St. Car
	21	Hop. Bods.	100,000	.....	.....	.....	June	.....	Warren St. Car
	20	Tank	12,500g.	.....	.....	.....	July	.....	Standard Tank
Central of Georgia.....	500	D. S. Box	80,000	40 0	St. Und'frame	45,500	November	.....	Tenn., C. I. & R. R.
	100	Flat	80,000	41 0	St. Und'frame	32,300	November	.....	Tenn., C. I. & R. R.
	10	Caboose	60,000	27 0	St. Und'frame	.....	November	.....	Tenn., C. I. & R. R.
	500	D. S. Box	80,000	40 0	St. Und'frame	.....	December	.....	Tenn., C. I. & R. R.
Central of New Jersey.....	49	S. S. Box	80,000	40 0	Steel Frame	44,700	November	Feb., 1925	Standard Steel
	1	Box	100,000	40 6 3/4	All Steel	46,500	November	Feb., 1925	Standard Steel
	25	Dump	30 yd.	.....	.....	.....	November	.....	Magor Car
Central Vermont.....	200	Box	80,000	.....	St. Und'frame	.....	August	.....	Am. Car & Fdy.
Chesapeake & Ohio.....	1,000	D. S. Auto	80,000	40 6	Steel Frame	45,500	April	Jan., 1925	Ill. Car & Mfg.
	2,000	H. B. Gond.	115,000	30 0	All Steel	42,200	February	December	Standard Steel
	1,000	H. B. Gond.	115,000	30 0	All Steel	42,200	April	November	Am. Car & Fdy.
	1,000	H. B. Gond.	115,000	30 0	All Steel	40,600	April	November	General American
	1,000	H. B. Gond.	115,000	30 0	All Steel	42,600	April	Feb., 1925	Newport News
	500	H. B. Gond.	115,000	30 0	All Steel	40,900	April	November	Ill. Car & Mfg.
	600	H. B. Ballast	115,000	30 0	All Steel	42,500	April	October	Am. Car & Fdy.
	100	Caboose	.....	24 0 1/2	Steel Frame	41,400	June	December	Standard Steel
	1,000	H. B. Gon. Bod.	140,000	39 0	All Steel	49,000	August	Mar., 1925	Richmond Car Wks.
	987	H. B. Gond. Bod.	140,000	39 0	All Steel	49,000	August	Mar., 1925	Am. Car & Fdy.
Chicago & North Western.....	500	S. S. Box	80,000	40 6	St. Und'frame	45,300	November	March	Pressed Steel
	500	S. S. Box	80,000	40 6	St. Und'frame	45,300	November	March	Bettendorf Co.
	500	S. S. Auto	80,000	40 6	St. Und'frame	47,000	November	March	Pressed Steel
	500	S. S. Auto	80,000	40 6	St. Und'frame	47,000	November	March	Am. Car & Fdy.
	500	D. R. Stock	80,000	36 10 1/2	St. Und'frame	43,900	November	March	Ill. Car & Mfg.
	500	Flat	100,000	42 1 1/2	St. Und'frame	38,000	November	March	Standard Steel
	200	Refrigerator	80,000	40 1 1/2	St. Und'frame	56,800	November	March	Am. Car & Fdy.
Chicago, Burlington & Quincy.....	1,000	Stock	60,000	36 1 1/2	Steel Frame	35,900	April	November	Streator Car Co.
	250	Stock	.....	.....	St. Cent. Sills	.....	.....	.....	Company Shops
Chic., Ind. & Louisville.....	82	Gondola	100,000	37 5 1/4	St. Cent. Sills	37,100	May	July-Nov.	Company Shops
	151	L. S. Gond.	100,000	37 5 1/4	St. Cent. Sills	36,000	May	July-Nov.	Company Shops
Chic., Rock Island & Pac.....	250	D. S. Ref. Bod.	100,000	40 9 3/4	St. Und'frame	45,500	July	December	Pressed Steel
	750	D. S. Ref. Bod.	100,000	40 9 3/4	St. Und'frame	45,500	November	1925	Pressed Steel
Cinn., New Orleans & Tex. Pac....	250	L. S. Gond.	100,000	41 6	All Steel	40,200	March	August	Tenn., C. I. & R. R.
	250	Hopper	100,000	30 9	Steel Frame	42,500	March	July-Aug.	Standard Steel
Cincinnati Northern.....	500	D. S. Auto	80,000	40 6	St. Und'frame	44,000	February	June	Am. Car & Fdy.
Clev., Cinn., Chic. & St. Louis....	2,000	Box	110,000	40 6	All Steel	46,000	February	May-July	Am. Car & Fdy.
	500	S. C. Hopper	140,000	39 0	All Steel	50,500	February	Nov.-Dec.	Standard Steel
	500	Refrigerator	70,000	41 4 3/4	St. Und'frame	54,500	February	July-Sept.	M. D. T. Co.
	1,000	Box	110,000	.....	St. Und'frame	.....	November	.....	Am. Car & Fdy.
	151	Misc.	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Colorado & Southern.....	50	Misc.	.....	.....	All Wood	.....	.....	.....	Company Shops
Commercial Car Line.....	25	Tank	8,050g.	.....	All Steel	.....	.....	.....	Penn. Car Co.
Conley Tank Car Co.....	11	Tank	.....	.....	.....	.....	.....	.....	Standard Tank
Cranberry Creek Coal Co.....	2	Dump	30 cu. yd.	.....	.....	.....	December	.....	Clark Car Co.
C. R. P. & L. Co.....	6	Hopper	140,000	36 10 1/2	All Steel	52,200	March	July	Ralston
Delaware, Lackawanna & Western..	750	Automobile	80,000	40 6	St. Und'frame	46,000	February	June-Aug.	Am. Car & Fdy.
	250	Automobile	80,000	40 6	St. Und'frame	45,900	February	May-July	Magor Car Co.
	40	Caboose	.....	24 3	St. Und'frame	43,200	June	Nov.-Dec.	Mt. Vernon
Denver & Intermountain.....	1	Caboose	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
	1	Utility	.....	.....	.....	.....	.....	.....	Company Shops
Denver & Rio Grande Western....	32	S. S. Auto	80,000	40 6	Steel Frame	45,000	June	December	Penn. Car
	100	Narrow Gage	.....	.....	St. Und'frame	.....	.....	.....	Company Shops



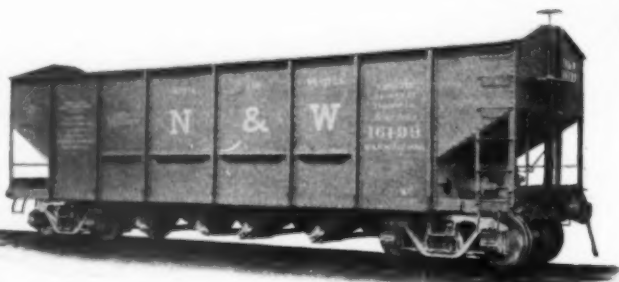
Freight Car Orders, 1901 to 1924



A Selection of Some of the Important
1924 Steel Freight Car Orders

Louisville & Nashville All-Steel 50-ton Drop
Bottom Gondola Car. Built by Pressed
Steel Car Company

Northern Pacific 75-ton Ore Car. Built by
Pressed Steel Car Company



Norfolk & Western 70-ton Hopper Car. Built
by Pressed Steel Car Company

Chesapeake & Ohio 57½-ton Hopper Car. Built
by Standard Steel Car Company



Reading Company 70-ton All-Steel Hopper Car.
Built by Standard Steel Car Company

Duluth, South Shore & Atlantic 40-ton Steel
Flat Car. Built by Pullman Car & Manu-
facturing Corporation



Purchaser	No.	Class	Capacity	Length Ft. In.	Construction	Weight	Date of Order	Date of Delivery	Builder
Detroit Edison Co.	20	Gondola	100,000	36 10½	All Steel	42,172	June	August	Pressed Steel
Detroit & Mackinac	45	Misc.			All Wood				Company Shops
Duluth, Missabe & Northern	25	Ore	180,000	21 1	All Steel	49,000	November	Apr., 1925	Pullman
	25	Ore	160,000	19 5	All Steel	49,000	November	1925	Am. Car & Fdy.
	7	Caboose			St. Und'frame				Company Shops
Duluth, So. Shore & Atlantic	200	Flat	80,000	40 0	St. Und'frame	35,200	July	October	Pullman
	11	Caboose		26 0	St. Und'frame	36,000	July	December	Soo Line Shops
East Jersey Railroad & Terminal	64	Tank	10,000g.		All Steel				Am. Car & Fdy.
Edgerton I. V.	1	Poultry	60,000	36 6	Steel Frame	61,700	August	October	Ill. Car & Mfg.
El Paso & Southwestern	400	Box	100,000	40 5¾	St. Und'frame	42,666	January	November	Standard Steel
Empire Refineries	275	Tank	80,000		All Steel		February		Am. Car & Fdy.
	20	Tank	80,000		All Steel		February		Am. Car & Fdy.
	75	Tank	100,000		All Steel		February		Am. Car & Fdy.
Erie	21	S. S. Box	80,000	40 2½	Steel Frame	39,600	October		Company Shops
Florida East Coast	200	D. S. Box	80,000	39 10	St. Und'frame	52,000	May	October	Mt. Vernon
	20	Caboose	60,000	33 10	St. Und'frame	48,500	May	October	Mt. Vernon
	100	Ballast	80,000	34 0	Wood	36,900	June	October	Am. Car & Fdy.
	10	Tank	10,000g.						Gen.-Amer. Tank
Ford Motor Co.	7	Tank	100,000	37 3	All Steel	53,000	July	August	Standard Tank
	87	Flat	80,000	36 1	Wood	28,000			Rouge Plant
Fruit Growers Express	800	Refrigerator	60,000	33 2¾	St. Und'frame	52,500	June	September	Company Shops
Gary Tube Co.	24	Flat	40,000	25 0	All Steel		February	October	Pressed Steel
	17	Flat	200,000	46 0	All Steel	62,975	May	December	Pressed Steel
	13	Flat	140,000	26 0	All Steel	41,400	May	December	Pressed Steel
General Electric Co.	7	Dump	100,000						Clark Car Co.
General Petroleum Corp.	10	Tank	10,100g.	35 8	Steel Frame	46,800	August	September	Penn. Car Co.
	25	Tank	100,000	36 0	Steel Frame	46,800	November	December	Gen. Amer. Tank
Georgia	100	S. S. Box	60,000	36 0	Steel Frame	39,000			Company Shops
	75	S. S. Box	60,000	36 0	Steel Frame	39,000			Company Shops
	20	Gondola	100,000	36 0	Wood	41,000			Company Shops
	44	Flat	100,000	36 0	Wood	34,000			Company Shops
	150	Box	100,000	40 6	Steel Frame	44,000	July	September	Tenn., Coal & Iron
	150	Flat	100,000	40 0	Steel Frame		July	November	Tenn., Coal & Iron
Georgia Southern & Fla.	1,000	D. S. Box	80,000	36 0	St. Cent. Sills	43,400	November	Feb., 1925	Am. Car & Fdy.
Goodwin, Gallagher Sand & Gravel Co.	12	Hopper	60,000		All Steel				Magor
Graver Corp.	2	Flat	100,000	65 0	All Steel	53,000	September	December	Ill. Car & Mfg.
Great Northern	200	S. S. Auto	100,000	50 6	Steel Frame	54,500			Company Shops
	900	S. S. Auto	100,000	50 6	Steel Frame	54,000	October		General American
	600	D. S. Box	100,000	40 6	Steel Frame	44,100			Company Shops
	500	Ore	150,000	21 5½	All Steel	40,500	October		Bethlehem Steel
	20	Tank	12,500g.	37 0	All Steel	46,000	September		Standard Tank
	250	Ore	150,000	19 10	All Steel	40,400	March	August	Bethlehem Steel
	800	Stock Bods.	60,000	35 7	All Wood	32,600	January	August	Siemens-Stemmel
	40	Dump	30 yd.				November		Pressed Steel
Greenbrier & Eastern	1	Caboose		24 0½	St. Und'frame	41,352	June	November	Standard Steel
Gulf Coast Lines	500	S. S. Box	80,000	40 0	Steel Frame				Am. Car & Fdy.
	500	S. S. Auto	80,000	40 0	Steel Frame				Pullman
	250	Gondola	80,000	40 8	Steel Frame		October		Mt. Vernon
Hocking Valley	1,000	D. S. Auto	80,000	40 6	Steel Frame	45,500	May	September	Pullman
Huasteca Petroleum Co.	8	Comp. Tank	80,000	32 5¾	All Steel	46,000	June	September	Am. Car & Fdy.
Illinois Central	1,000	Gondola	100,000	40 8¾	St. Und'frame	47,500	September	1st qr. 1925	Pullman
	1,000	Gondola	100,000	40 8¾	St. Und'frame	47,500	September	1st qr. 1925	Western S. C. & F.
	1,000	Gondola	100,000	40 8¾	St. Und'frame	47,500	September	1st qr. 1925	General American
	500	Gondola	100,000	40 8¾	St. Und'frame	47,500	September	1st qr. 1925	Ryan
	500	Gondola	100,000	40 8¾	St. Und'frame	47,500	September	1st qr. 1925	Mt. Vernon
	1,000	Box	80,000	40 6	St. Und'frame	47,000	September	1st qr. 1925	Standard Steel
	1,000	Box	80,000	40 6	St. Und'frame	47,000	September	1st qr. 1925	Am. Car & Fdy.
	200	Stock	80,000	40 6¾	St. Und'frame	41,500	September	1st qr. 1925	Am. Car & Fdy.
Illinois Traction	100	Box	80,000		St. Und'frame		January		Am. Car & Fdy.
Indiana Harbor Belt	1	D. S. Cab.	60,000	25 5	St. Und'frame	36,000	January	April	Company Shops
Jeddo Highland Coal Co.	1	Dump	30 cu. yd.						Clark Car Co.
Kingan Refrigerator Line	100	Refrigerator	80,000	35 2	St. Cent. Sills	56,000	March	August	Am. Car & Fdy.
Landreth Gasoline Co.	50	Tank	8,000g.						Gen. Amer. Tank
Long Island	15	Cabin		29 4¼	Steel Frame	35,600	November	Jan., 1925	Pressed Steel
Los Angeles & Salt Lake	25	Caboose		39 2¾	St. Und'frame	36,370			O. S. L. Shops
Louisville & Nashville	500	S. S. Auto	100,000	40 6	St. Und'frame	45,300	March	September	Pressed Steel
	500	S. S. Auto	100,000	40 6	St. Und'frame	45,300	March	September	Tenn., C. I. & R. R.
	1,000	S. S. Box	100,000	40 6	St. Und'frame	44,600	March	October	Tenn., C. I. & R. R.
	500	S. S. Box	100,000	40 6	St. Und'frame	44,600	March	September	Mt. Vernon
	1,100	D. B. Gond.	100,000	40 6	All Steel	42,700	March	October	Pressed Steel
	101	Ballast	110,000	30 6	All Steel	45,600	March	July	Am. Car & Fdy.
	400	Gondola	110,000				December		Pressed Steel
	600	Gondola	100,000		All Steel		December		Pressed Steel
	1,000	Gondola					December		Pressed Steel
	75	Misc.			St. Und'frame				Company Shops
Louisville, Hend. & St. Louis	20	Ballast	100,000		All Steel		January		Am. Car & Fdy.
Magnolia Petroleum Co.	50	Tank	100,000		All Steel		June	August	Am. Car & Fdy.
Maine Central	250	S. S. Box	80,000	40 6	Steel Frame	40,000	March	July	Laconia
	100	Gen. Serv.	100,000	40 0	All Steel	40,300	March	June	Standard Steel
Manufacturers Ry.	25	Refrigerator	80,000	40 0	St. Und'frame	55,400	January	Dec., 1925	Company Shops
Marion Steam Shovel Co.	1	Dump	30 cu. yd.						Clark Car
Marland Refining Co.	1	Compt. Tank	4,519g.	67 0	All Steel		August	December	Gen. Amer. Tank
	1	Compt. Tank	6,191g.	70 0	All Steel		August	November	Gen. Amer. Tank
	1	Compt. Tank	5,994g.	70 0	All Steel		August	November	Gen. Amer. Tank
Mathison Alkali Wks.	10	Tank	8,000g.		All Steel		March	April	Am. Car & Fdy.
McKinney Steel Co.	10	Flat	200,000		All Steel	61,000	November	1925	Pressed Steel
Mexican Petroleum Corp.	22	Tank	80,000	32 5¾	All Steel	42,000	June	July	Am. Car & Fdy.
Michigan Central	1,000	Box	110,000	40 6	All Steel	45,900	February	July-Aug.	Am. Car & Fdy.
	1,000	Box	110,000	40 6	All Steel	47,600	February	July-Sept.	Standard Steel
	200	S. D. Stock	80,000	40 3	St. Und'frame	42,000	October	December	Ill. Car & Mfg.
	199	Flat	80,000	40 0	St. Und'frame	32,800	October	December	Kilby Car & Mfg.
Mill Power Supply Co.	10	Flat	100,000						Ill. Car & Fdy.
Minn. Northfield & Southern	2	Caboose		31 0	St. Und'frame	34,700	July	August	Siemens-Stemmel Co.
Misko Refineries	2	Tank	8,050g.						Standard Tank
Missouri Pacific	250	S. S. Auto	80,000	40 6	Steel Frame	45,000	August		Am. Car & Fdy.
	250	S. S. Auto	80,000	40 6	Steel Frame	45,000	August		General American
	500	S. S. Auto	80,000	40 6	Steel Frame	45,000	August		Standard Tank
	75	Caboose		30 0	St. Und'frame		October		Am. Car & Fdy.
	40	Caboose							Am. Car & Fdy.

Purchaser	No.	Class	Capacity	Length Ft. In.	Construction	Weight	Date of Order	Date of Delivery	Builder
Missouri Pacific, Continued.....	1,000	Box	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
	1,000	Automobile	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
	1,000	Box	.....	.....	.....	.....	.....	.....	General American
Mobile & Ohio.....	595	D. S. Box	80,000	36 0	St. Cent. Sills	43,400	November	Feb., 1925	Am. Car & Fdy.
	200	Gondola	100,000	41 6	Steel Frame	44,600	November	Feb., 1925	General American
	150	Hopper	100,000	30 9	Steel Frame	42,500	Nov.	Jan.-Feb., 1925	Kilby Car & Fdy.
	150	Stock	80,000	40 0	St. Cent. Sills	46,000	November	Feb., 1925	Tenn., C. I. & R. R.
Morrell J. & Co.....	100	Refrigerator	60,000	.....	St. Cent. Sills	.....	February	.....	Am. Car & Fdy.
Nash, Chatt. & St. Louis.....	50	Ballast	110,000	30 4 3/4	All Steel	45,300	February	October	Tenn., C. I. & R. R.
Nassau Sand & Gravel Co.....	2	Hopper	60,000	.....	All Steel	.....	.....	.....	Magor
National Refining Co.....	16	Tank	.....	.....	.....	.....	.....	.....	Standard Tank
New Jersey, Indiana & Illinois.....	200	Auto	80,000	.....	.....	.....	.....	.....	Am. Car & Fdy.
New York Central.....	5,000	S. C. Hopper	140,000	39 0	St. Und'frame	.....	November	.....	Am. Car & Fdy.
	2,000	Box	110,000	40 6	All Steel	50,400	February	November	Standard Steel
	1,000	Auto-Box	110,000	40 6	All Steel	46,500	February	October	Am. Car & Fdy.
	440	Refrigerator	70,000	33 0	All Steel	47,500	February	November	Pressed Steel
	1,500	S. C. Hopper	140,000	39 0	St. Und'frame	55,000	February	July	M. D. T. Co.
	500	S. C. Hopper	140,000	39 0	All Steel	50,600	February	September	Pressed Steel
	500	Box	110,000	40 6	All Steel	50,400	February	December	Standard Steel
	500	Box	110,000	40 6	All Steel	46,500	November	.....	Pressed Steel
	500	Box	110,000	40 6	All Steel	46,500	November	.....	M. D. T. Co.
	1,000	Box	110,000	40 6 3/4	All Steel	46,545	November	Feb., 1925	Standard Steel
	75	Dump	30 cu. yd.	.....	.....	.....	.....	.....	Clark Car Co.
N. Y., Chicago & St. Louis.....	1,000	S. S. Auto	80,000	40 6	St. Und'frame	46,100	March	October	Ill. Car & Mfg.
	300	D. D. Stock	80,000	36 1	St. Und'frame	41,700	March	September	General American
	15	Caboose	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
	225	Flat	80,000	.....	St. Cent. Sills	.....	.....	.....	Company Shops
New York, Ontario & Western.....	16	Caboose	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Norfolk & Western.....	1,000	D. S. Box	100,000	40 6	Steel Frame	47,300	September	Jan.-Feb.	Standard Steel
	1,000	Hopper	140,000	36 10 3/4	All Steel	51,500	February	Apr.-Oct.	Va. Bridge & Iron
	1,000	Hopper	140,000	36 10 3/4	All Steel	51,500	February	Apr.-Oct.	Standard Steel
	1,000	Hopper	140,000	36 10 3/4	All Steel	51,500	February	Apr.-Oct.	Pressed Steel
	1,000	Hopper	140,000	36 10 3/4	All Steel	51,500	February	Apr.-Oct.	Bethlehem Steel
	2,000	Hopper	140,000	36 10 3/4	All Steel	51,500	February	Apr.-Oct.	Ralston
	1,000	Gondola	115,000	41 3	All Steel	41,500	November	Jan., etc.	Ralston
	1,000	Gondola	115,000	41 3	All Steel	41,500	November	Feb., etc.	Pressed Steel
	1,000	Gondola	115,000	41 3	All Steel	41,500	November	Mar., etc.	Newport News
	1,000	Gondola	115,000	41 3	All Steel	41,500	November	Dec., etc.	Va. B. & L. Shops
	25	Cabin	.....	24 1 3/4	St. Und'frame	.....	.....	June-July	Roanoke Shops
	700	Gon. Bods.	115,000	38 7 1/2	All Steel	40,000	March	October	Ralston
Northern Pacific.....	200	Ore	150,000	19 11	All Steel	42,700	February	.....	Pressed Steel
	800	Gondola	.....	.....	.....	.....	December	August	Ryan
Northern Refr. Car. Co.....	500	Refrigerator	60,000	39 1 1/2	St. Und'frame	56,400	.....	.....	Pullman
Northwestern Pacific.....	8	Caboose	.....	40 0	.....	.....	.....	.....	Company Shops
	36	Flat	.....	.....	.....	.....	.....	.....	Company Shops
O'Brien Brothers Sand & Gravel Co.	4	Hopper	80,000	.....	.....	.....	.....	.....	Magor
Oliver Iron Mining Co.....	25	Dump	30 cu. yd.	.....	All Steel	41,400	February	June	Mt. Vernon
	7	Flat	100,000	40 0	All Steel	56,000	April	May	West. Wh. Scraper
Oregon Short Line.....	6	Dump	20 cu. yd.	26 0	All Steel	36,370	.....	.....	Company Shops
	10	Caboose	.....	39 2 3/4	St. Und'frame	36,370	.....	.....	O. S. L. Shops
Oregon-Wash. R. R. & Nav. Co.....	8	Caboose	.....	39 2 3/4	St. Und'frame	36,370	.....	.....	O. S. L. Shops
Pacific Coast R. R.....	15	G. S. Gondola	100,000	40 0	Steel Frame	40,000	January	March	Pac. Car & Fdy.
Pacific Coast Ry. Co.....	25	D. S. Box	60,000	36 0	Wood Frame	29,000	April	May	Pac. Car & Fdy.
	60	Flat	60,000	33 0	Wood Frame	19,000	April	May	Pac. Car & Fdy.
Pacific Fruit Express.....	500	Refrigerator	60,000	33 2 3/4	St. Und'frame	53,000	January	May-Aug.	General American
	957	Refrigerator	60,000	33 2 3/4	St. Und'frame	53,000	January	May-July	Pac. Car & Fdy.
	800	Refrigerator	60,000	33 2 3/4	St. Und'frame	53,000	January	Apr.-June	Pullman
	800	Refrigerator	60,000	33 2 3/4	St. Und'frame	53,000	January	Apr.-June	Standard Steel
Pennsylvania.....	1,000	D. S. Box	100,000	40 6	All Steel	48,200	February	November	Newport News
	2,000	D. S. Box	100,000	40 6	All Steel	48,200	March	October	Standard Steel
	3,000	D. S. Box	100,000	40 6	All Steel	46,200	March	Jan., 1925	Pressed Steel
	2,000	D. S. Box	100,000	40 6	All Steel	46,200	March	October	Am. Car & Fdy.
	2,000	D. S. Box	100,000	40 6	All Steel	46,200	March	November	Pullman
	500	Stock	100,000	40 6	Steel Frame	46,200	March	October	Bethlehem Steel
	500	Stock	100,000	40 6	Steel Frame	44,500	March	September	General American
	2,500	D. S. Box	100,000	40 6	All Steel	46,200	September	September	Ill. Car & Mfg.
	2,500	D. S. Box	100,000	40 6	All Steel	46,200	September	Mar., 1925	Bethlehem Steel
	2,500	D. S. Box	100,000	40 6	All Steel	46,200	September	Mar., 1925	Pressed Steel
	2,500	D. S. Box	100,000	40 6	All Steel	46,200	September	Mar., 1925	Am. Car & Fdy.
	2,500	D. S. Box	100,000	40 6	All Steel	46,200	September	Apr., 1925	Standard Steel
Penn. Power & Light Co.....	4	Dump	30 cu. yd.	.....	.....	.....	.....	.....	Clark Car
Penn. Salt Mfg. Co.....	2	Tank	80,000	.....	All Steel	.....	.....	.....	Gen. Amer. Tank
Pennsylvania Tank Line.....	16	Compt. Tank	8,050g.	.....	All Steel	.....	.....	.....	Penn. Car Co.
	11	Tank	8,050g.	.....	All Steel	.....	.....	.....	Penn. Car Co.
	4	Tank	8,050g.	.....	All Steel	.....	.....	.....	Penn. Car Co.
Pere Marquette.....	12	Caboose	.....	30 9	St. Und'frame	36,000	November	December	Company Shops
Phillips Petroleum Co.....	125	Tank	80,000	36 0	All Steel	49,000	May	July-Aug.	Gen. Amer. Tank
Pickands Mather & Co.....	42	Dump	20 cu. yd.	.....	.....	.....	.....	.....	Magor
Pittsburgh & Lake Erie.....	1,000	S. C. Hopper	140,000	39 0	All Steel	50,600	February	October	Pressed Steel
	14	Caboose	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Pittsburgh Oil & Ref. Co.....	12	Tank	10,000g.	32 6 3/4	All Steel	100,000	April	April	Am. Car & Fdy.
Quaker City Tank Line.....	125	Tank	8,050g.	.....	All Steel	.....	.....	.....	Standard Tank
	75	Tank	10,050g.	.....	All Steel	.....	.....	.....	Standard Tank
	3	Compt. Tank	6,050g.	.....	All Steel	.....	.....	.....	Standard Tank
	5	Compt. Tank	6,050g.	.....	All Steel	.....	.....	.....	Standard Tank
Reading Company.....	400	Hopper	140,000	39 0	All Steel	52,431	January	Apr.-June	Pressed Steel
	200	Hopper	140,000	39 0	All Steel	53,310	January	May-June	Standard Steel
	200	Hopper	140,000	39 0	All Steel	52,639	January	May	Bethlehem Steel
	200	Hopper	140,000	39 0	All Steel	52,546	January	Apr.-May	Am. Car & Fdy.
	50	Stock	80,000	38 0	St. Und'frame	40,810	January	May	Standard Steel
	1,000	Hopper	140,000	39 0	All Steel	52,000	October	Spring, 1925	Bethlehem Steel
	500	Gondola	140,000	46 0	All Steel	50,600	September	Spring, 1925	Bethlehem Steel
	500	Gondola	140,000	46 0	All Steel	50,600	September	Spring, 1925	Pressed Steel
	500	Box	100,000	40 6 3/4	All Steel	47,000	September	Spring, 1925	Am. Car & Fdy.
	500	Box	100,000	40 6 3/4	All Steel	47,000	September	Spring, 1925	Standard Steel
	15	Misc.	.....	.....	All Steel	.....	.....	.....	Company Shops
Richmond, Fred. & Potomac.....	15	Ballast	100,000	.....	All Steel	.....	March	.....	Am. Car & Fdy.
Robinson Clay Prod. Co.....	2	Ore	150,000	19 11	All Steel	42,400	April	August	Pressed Steel
Rutland.....	200	D. S. Auto	80,000	40 6	St. Und'frame	44,000	February	July-Aug.	Youngstown
	300	D. S. Box	80,000	40 6	St. Und'frame	44,000	February	Sept-Oct.	Youngstown
St. Louis Southwestern.....	1,000	D. S. Box	80,000	.....	.....	.....	December	.....	Mt. Vernon
	20	Caboose	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
	250	Misc.	.....	.....	All Wood	.....	.....	.....	Company Shops

Purchaser	No.	Class	Capacity	Length		Construction	Weight	Date of Order	Date of Delivery	Builder
Seaboard Air Line.....	466	Flat	80,000	41	4 1/4	Steel Frame	33,000	January	June-Aug.	Va. Bridge & Iron
American & Fdy.	466	Flat	80,000	41	4 1/4	Steel Frame	33,000	January	June-Aug.	Richmond Car Wks.
American & Fdy.	25	Ballast	100,000	.....	.....	All Steel	.....	March	.....	Am. Car & Fdy.
American & Fdy.	10	Caboose	.....	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Skelly Oil Co.....	35	Tank	.....	.....	.....	All Steel	48,300	March	Apr.-May	Standard Tank
Southern Railway	1,000	Gondola	100,000	41	6	All Steel	40,200	March	June-Aug.	Tenn. C. I. & R. R.
.....	500	Hopper	100,000	30	9	Steel Frame	42,500	March	June-July	Standard Steel
.....	2,000	D. S. Box	80,000	36	0	St. Cent. Sills	43,400	October	Dec.-Jan.	Am. Car & Fdy.
.....	250	Flat	100,000	40	6	St. Und'frame	34,000	October	Dec.-Jan.	Am. Car & Fdy.
.....	1,000	D. S. Box	80,000	36	0	St. Cent. Sills	43,400	October	Dec.-Jan.	Mt. Vernon
.....	250	Stock	80,000	40	0	St. Cent. Sills	46,000	October	Jan., 1925	Tenn. C. I. & R. R.
.....	1,063	Gondola	100,000	41	9	Steel Frame	44,500	November	.....	Lenoir Car Wks.
.....	40	Hopper	100,000	30	0	Steel Frame	39,500	November	.....	Lenoir Car Wks.
Southern Pacific	10	Dump	.....	.....	.....	.....	.....	.....	.....	West. Wh. Scraper
.....	30	Dump	.....	.....	.....	.....	.....	.....	.....	Case Crane & Engr.
So. Pacific (Tex. & La. Lines).....	500	Flat	80,000	40	10 3/4	St. Cent. Sills	34,250	March	August	Company Shops
.....	25	Caboose	60,000	29	7	St. Und'frame	38,750	March	July	Company Shops
Spokane, Portland & Seattle.....	60	Logging	.....	.....	.....	.....	.....	.....	.....	Magor
Staley, A. E., Mfg. Co.....	2	H. B. Coal	.....	.....	.....	All Steel	.....	.....	.....	.....
Standard Oil Co.....	10	Gondola	100,000	36	10 1/4	All Steel	42,172	March	August	Pressed Steel
Sun Oil Company.....	7	Compt. Tank	.....	.....	.....	All Steel	.....	.....	.....	Standard Tank
Swift & Co.	100	D. D. Stock	.....	.....	.....	.....	.....	.....	.....	Company Shops
Syrup Products Co., Inc.....	4	Tank	8,050g.	.....	.....	All Steel	.....	.....	.....	Penn. Car Co.
Tennessee Coal, Iron & R. R.....	4	Dump	30 cu.yr.	.....	.....	.....	.....	.....	.....	Clark Car Co.
Texas Company	700	Tank	8,050g.	.....	.....	All Steel	.....	.....	.....	Penn. Car Co.
.....	300	Tank	10,100g.	.....	.....	All Steel	.....	.....	.....	Penn. Car Co.
Texas & Pacific.....	1,000	D. S. Auto	80,000	40	6	St. Und'frame	47,000	September	December	Am. Car & Fdy.
.....	1,000	D. S. Auto	80,000	40	6	St. Und'frame	48,900	September	December	Pullman
Tonopah & Tidewater.....	1	S. S. Box	80,000	39	0	Steel Frame	38,900	.....	October	Company Shops
.....	3	Gondola	100,000	30	0	All Steel	39,000	June	November	Mt. Vernon
Tri-State Refining Co.....	6	Tank	8,050	.....	.....	All Steel	.....	.....	.....	Standard Tank
Union K. R.	500	Hop. Bod.	55,000	30	6	All Steel	43,500	March	.....	Greenville
.....	500	Hop. Bod.	55,000	30	6	All Steel	43,500	December	.....	Greenville
Union Carbide Co.....	6	Tank	80,000	.....	.....	All Steel	.....	.....	.....	Gen. Amer. Tank
Union Oil Co. of California.....	10	Tank	6,500g.	32	6 3/4	All Steel	36,300	May	August	Am. Car & Fdy.
.....	10	Tank	8,000g.	32	6 3/4	All Steel	47,300	May	August	Am. Car & Fdy.
.....	15	Tank	10,000g.	32	6 3/4	All Steel	54,500	May	October	Am. Car & Fdy.
.....	30	Tank	10,000g.	32	6 3/4	All Steel	49,600	May	August	Am. Car & Fdy.
Union Pacific	250	Tank	12,500g.	35	0 1/4	All Steel	50,700	January	April-May	Am. Car & Fdy.
.....	250	Tank	12,500g.	33	7 1/2	All Steel	50,400	February	April-June	Gen. Amer. Tank
.....	50	Caboose	.....	39	2 3/4	St. Und'frame	36,370	.....	.....	O. S. L. Shops
Union Refrig. Transit Co.....	300	Refrigerator	80,000	32	9 3/4	St. Und'frame	57,000	February	July-Oct.	Company Shops
.....	500	Refrigerator	80,000	32	9 3/4	St. Und'frame	57,000	July	Sept.-Nov.	Am. Car & Fdy.
.....	250	Refrigerator	80,000	32	9 3/4	St. Und'frame	57,000	Sept.	Apr.-June, 1925	Company Shops
U. S. Army	1	Helium Tank	140,000	42	0	All Steel	183,000	June	April	Bethlehem Steel
U. S. Food Products Car Line.....	50	Tank	8,000g.	.....	.....	All Steel	.....	.....	.....	Am. Car & Fdy.
U. S. Rubber Co.....	10	Tank	8,000g.	.....	.....	.....	.....	August	August	Am. Car & Fdy.
.....	3	Tank	10,000g.	.....	.....	.....	.....	November	December	Gen. Amer. Tank
United Verde Copper Co.....	60	Dump	.....	.....	.....	.....	.....	.....	.....	Pressed Steel
Universal Portland Cement Co.....	50	Hopper	140,000	38	10	All Steel	45,500	March	July	Mt. Vernon
Utah Railway	2	Caboose	.....	29	7	St. Und'frame	37,000	April	July	Mt. Vernon
Virginia Smelting Co.....	2	Tank	.....	.....	.....	All Steel	.....	.....	.....	Gen. Amer. Tank
Wabash	1,000	Auto	80,000	40	6	Steel Frame	47,000	November	April	Am. Car & Fdy.
.....	25	Caboose	60,000	31	2 3/4	St. Und'frame	40,000	Jan.-July	July-Dec.	Company Shops
.....	25	Caboose	40,000	29	4 3/4	St. Und'frame	37,000	November	Mar., 1925	Am. Car & Fdy.
.....	125	Gondola	100,000	41	6	St. Und'frame	43,500	Jan.-Apr.-Sep.	July-Dec.	Company Shops
.....	400	Gondola Bods.	.....	.....	.....	.....	.....	.....	.....	Streator Car Co.
Waite Phillips Company.....	100	Tank	8,000g.	.....	.....	All Steel	.....	.....	.....	Gen. Amer. Tank
.....	50	Tank	10,000g.	.....	.....	All Steel	.....	.....	.....	Gen. Amer. Tank
Western Electric	4	Logging	80,000	.....	.....	.....	.....	April	.....	Magor
Western Fruit Express	1,000	Refrigerator	60,000	33	2 3/4	St. Und'frame	52,500	June	September	Company Shops
.....	193	Refrigerator	60,000	33	2 3/4	St. Und'frame	52,500	December	December	Company Shops
.....	157	Refrigerator	60,000	33	2 3/4	St. Und'frame	52,500	December	1925	Company Shops
Western Pacific	775	Refrigerator	80,000	33	2 3/4	St. Und'frame	53,000	January	Apr.-June	Am. Car & Fdy.
.....	125	Stock	80,000	36	6 1/4	Steel Frame	37,700	February	July-Aug.	Pac. Car & Fdy.
.....	70	Stock	60,000	36	6	Steel Frame	37,600	November	Apr., 1925	Pac. Car & Fdy.
.....	11	Caboose	.....	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
.....	7	D. S. Box	.....	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
.....	4	Ballast	.....	.....	.....	St. Cent. Sills	.....	.....	.....	Company Shops
.....	3	Flat	.....	.....	.....	St. Cent. Sills	.....	.....	.....	Company Shops
Wheeling & Lake Erie.....	1,000	D. S. Box	100,000	40	6	All Steel	47,000	September	Jan., 1925	Standard Steel
.....	1	Misc.	.....	.....	.....	All Steel	.....	.....	.....	Company Shops
.....	2	Misc.	.....	.....	.....	St. Und'frame	.....	.....	.....	Company Shops
Wilburine Oil Works, Ltd.....	6	Tank	80,000	.....	.....	All Steel	.....	January	March	Warren Tank
Misc. Cos. & Individuals.....	156	Not otherwise specified or reported in detail.	.....	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
.....	5	Not otherwise specified or reported in detail.	.....	.....	.....	.....	.....	.....	.....	Mt. Vernon

Canada

Algoma Central & Hudson Bay.....	50	Ballast	100,000	40	0	St. Und'frame	.....	April	July	Can. Car & Fdy.
Canadian National	400	S. S. Box	120,000	40	6	Steel Frame	46,300	March	July	Can. Car & Fdy.
.....	400	S. S. Box	120,000	40	6	Steel Frame	47,600	March	July	National Steel
.....	200	S. S. Box	120,000	40	6	Steel Frame	46,900	March	September	Eastern Car
.....	50	Caboose	.....	29	8	St. Und'frame	41,700	March	August	Can. Car & Fdy.
.....	150	Ballast	100,000	40	0	Steel Frame	53,400	March	June	Can. Car & Fdy.
.....	500	Gen'l Serv.	100,000	41	6	Steel Frame	48,200	March	August	Eastern Car
.....	8	Snow Plows	.....	.....	.....	All Steel	65,200	March	November	Eastern Car
.....	3	Snow Plows	.....	.....	.....	All Steel	65,200	September	November	Eastern Car
Canadian Pacific	100	Refrigerator	71,800	41	0	St. Und'frame	64,200	January	June	Company Shops
Temiskaming & Nor. Ontario.....	6	Caboose	.....	28	2	St. Und'frame	40,500	March	July	Nat. Steel Car

Mexico

National Rys. of Mexico.....	800	Box	60,000	32	0	St. Und'frame	30,147	August	December	Standard Steel
.....	140	Stock	60,000	32	0	St. Und'frame	28,366	August	November	Standard Steel
.....	300	S. S. Box	80,000	40	6 1/4	Steel Frame	41,400	September	1925	Pressed Steel
.....	200	Tank	.....	.....	.....	Steel Frame	44,900	September	December	Pressed Steel
.....	50	Tank	.....	.....	.....	All Steel	.....	.....	.....	Gen. Amer. Tank
.....	50	Gondola	.....	.....	.....	All Steel	.....	.....	.....	Gen. Amer. Tank

Other Export

Purchaser	No.	Class	Capacity	Length		Construction	Weight	Date of Order	Date of Delivery	Builder
Atlantic Fruit Co.....	50	Cane	40,000	36	0	Steel Frame	20,000	January	December	Magor Car Co.
Central of Brazil.....	50	Refrigerator	.....	.....	.....	.....	.....	.....	.....	Middletown Car
Chile Exploration Co.....	80	Ore	140,000	21	11½	All Steel	54,800	January	April	Pressed Steel
Colombian Ry. & Navigation Co....	15	Flat	80,000	.....	.....	.....	.....	.....	.....	Magor
Cuba Cane Sugar Corp.....	75	Cane	60,000	35	0	Steel Frame	31,200	February	August	Am. Car & Fdy.
	50	Cane	60,000	35	0	Steel Frame	31,200	February	August	Am. St. Co. of Cuba
	35	Cane	30,000	30	0	All Steel	16,400	August	November	Am. Car & Fdy.
	75	Cane	60,000	35	0	All Steel	31,600	August	November	Am. Car & Fdy.
	100	Cane	60,000	34	1	All Steel	33,000	August	November	Am. Car & Fdy.
	65	Cane	40,000	26	.....	All Steel	26,000	August	November	Am. Car & Fdy.
General Sugar Co.	65	Cane	.....	.....	.....	.....	.....	.....	.....	Magor
	12	Cane	60,000	.....	.....	.....	.....	.....	.....	Magor
International Rys. of Cen. America.	90	Box	40,000	.....	.....	.....	.....	.....	.....	Gregg Co.
	50	Banana	.....	.....	.....	.....	.....	.....	.....	Magor
	20	Flat	.....	.....	.....	.....	.....	.....	.....	Magor
Manila R. R.	30	Flat	60,000	.....	.....	.....	.....	.....	.....	Koppel
South Australian Railways.....	600	.....	.....	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
	500	Box	.....	.....	.....	All Steel	.....	.....	.....	Am. Car & Fdy.
	100	.....	.....	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Ulen Contracting Co.....	5	Tank	5,000g.	.....	.....	All Steel	.....	.....	.....	Magor
United Fruit Co.....	30	.....	20,000	20	0	All Steel	7,000	January	April	Gregg Co.
	6	.....	14,000	20	5	All Steel	3,260	March	May	Koppel
	4	.....	40,000	26	2	All Steel	20,000	March	June	Am. Car & Fdy.
	100	.....	40,000	31	2	All Steel	16,000	March	May	Magor Car Co.
	20	.....	40,000	31	2	All Steel	16,000	August	November	Magor Car Co.
	50	.....	40,000	31	2	All Steel	16,000	September	November	Magor Car Co.

Statistical Review of 1924

(Continued from page 67)

to represent more accurately than at present a real norm of railway operations. The method underlying this chart parallels the method utilized for many years by the United States Weather Bureau, which shows each day the "departures from normal" in the matter of temperature, precipitation, and the like. The "normal" in each case is the average of the whole period for which the Weather Bureau has maintained records.

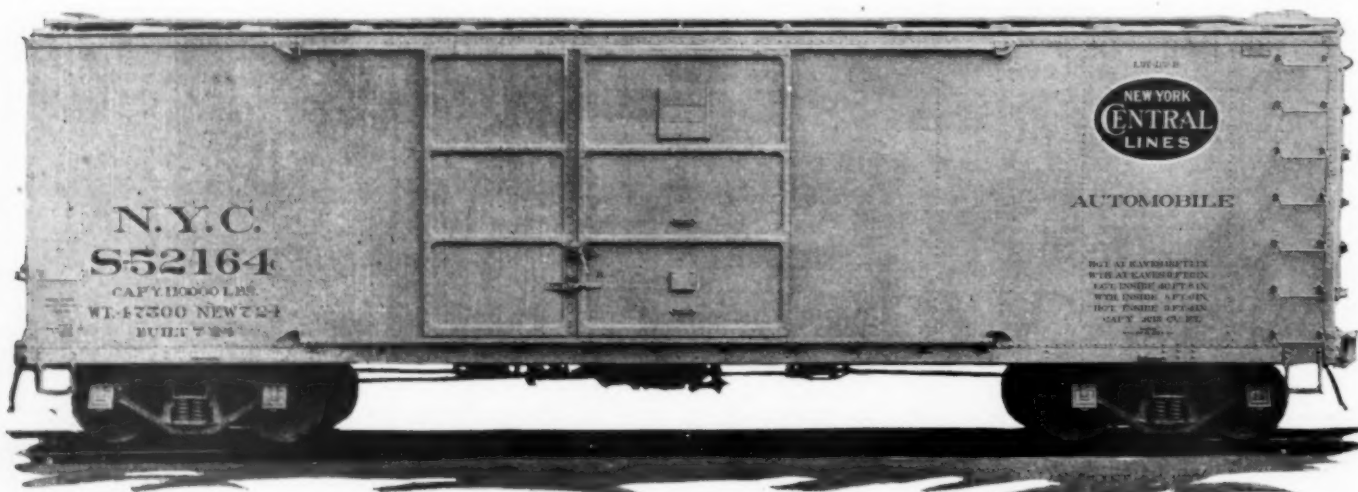
The chart indicates that revenues, net ton-miles and car surplus were above the average in 1924; railway taxes were 23 per cent greater than the average. Operating expenses, the operating ratio, passenger-miles, and employees were below the average; the rate of return on investment was 25 per cent below the only "normal" average in the chart, that is, the fair return of 5¾ per cent.

Summary

There is some danger that the railways and their well-wishers will be too enthusiastic about the results of the year 1924. While it is true that many long established

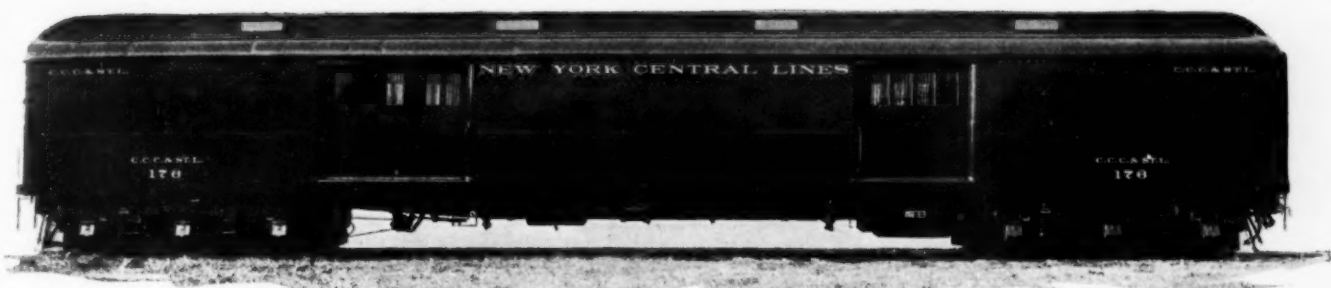
records of railway efficiency went by the board during the past year, it is also true that there remains much room for improvement. The achievements of the past two years should operate chiefly as a stimulus for better performance in 1925 and future years.

Furthermore, there must be a tinge of disappointment in the inability of the railways, even under most favorable conditions of economical and efficient operation, to earn anything like the fair return contemplated by the Transportation Act. What the solution of this problem will prove to be, only the future can disclose. Improvement in net income may be produced through increased traffic and revenues, or through further reductions in operating expenses by reason of improved methods of operation and increased capital facilities, or through a combination of both factors. But the railways should be permitted to increase their net income to the level contemplated by the law before extensive or drastic revisions are made, or even suggested, in the levels of freight or passenger rates or in the levels of railway wage rates. Any such revisions would either reduce railway revenues, or would increase operating expenses, with the inevitable effect of applying brakes to the progressive showing of the past two years in the matter of efficient and economical railway operation.



New York Central All-Steel Automobile Car. Built by Western Steel Car & Foundry Company

Co.
Car
el
Fdy.
of Cuba
Fdy.
Fdy.
Fdy.



The New York Central Lines Included 90 Baggage Cars in Their 1924 Passenger Train Car Orders. Built by American Car & Foundry Company

Fdy.
Fdy.
Fdy.

1924 Passenger Car Orders Large

Biggest year since 1913—Marked increase in gasoline rail motor car purchases

By F. W. Kraeger

ORDERS placed in 1924 for passenger train cars for service on the railways of the United States totaled 2,554. This compared with orders for 2,214 cars in 1923, and with 2,382 cars in 1922, and was the largest total reported for any year since 1913, in which orders for 3,124 cars were placed. The total shown

company as having been authorized to be constructed for Pullman Company service was 506, inclusive of parlor, sleeping, library and even a few dining cars. This number was much above the amount usually authorized by the company, and presumably results from the attention that is being given to high grade passenger service throughout the country. The railroads, of course, were large buyers, and several very sizable orders were reported, including notably one lot of 215 suburban cars

TABLE I—THE PASSENGER CAR ORDERS OF 1924

For service in the United States.....	2,554
For service in Canada.....	100
For export to other countries.....	25
Grand total.....	2,679

for 1924 does not include rail-motor-cars—whether gasoline, gas-electric, or electric storage battery—which amounted to an additional 120 cars as compared with 76 reported in 1923.

Railways in Canada placed orders for 100 passenger train cars with builders in Canada, this amount compar-

TABLE II—ORDERS FOR PASSENGER CARS SINCE 1901

Domestic Orders Only			
Year	Passenger cars	Year	Passenger cars
1901.....	2,879	1909.....	4,514
1902.....	3,459	1910.....	3,881
1903.....	2,310	1911.....	2,623
1904.....	2,213	1912.....	3,642
1905.....	3,289	1913.....	3,124
1906.....	3,402	1914.....	1,674
1907.....	1,791	1915.....	1,978
1908.....	1,319		

Domestic and Foreign				
Year	Domestic	Canadian	Export	Total
1916.....	2,302	....	109	2,411
1917.....	1,124	....	43	1,167
1918.....	9	22	26	57
1919.....	292	347	143	782
1920.....	1,781	275	38	2,094
1921.....	246	91	155	492
1922.....	2,382	87	19	2,488
1923.....	2,214	263	6	2,483
1924.....	2,554	100	25	2,679

ing with 263 in 1923. In addition they purchased 10 gasoline-rail-motor or railway storage battery cars.

Production of passenger train cars for domestic service in the United States totaled 2,150, as compared with 1,507 in 1923. The 1924 production was the largest reported since 1914, in which year 3,310 cars were built.

One of the reasons for the large total of passenger car purchases in 1924 was the large authorizations of cars for the Pullman Company. The total reported by that

TABLE III—PASSENGER CARS BUILT IN 1924

	United States	Canada	Total
Domestic.....	2,150	167	2,317
Foreign.....	63	...	63
	2,213	167	2,380

Comparison with Previous Years

Passenger			
Year	Domestic	Foreign	Total
1899.....	1,201	104	1,305
1900.....	1,515	121	1,636
1901.....	1,949	106	2,055
1902.....	From 1902 to 1907		1,948
1903.....	passenger car figures		2,007
1904.....	in these two columns		2,144
1905.....	included in corre-		2,551
1905*.....	sponding freight car		3,167
1907*.....	columns.		5,457
1908*.....	1,645	71	1,716
1909*.....	2,698	151	2,849
1910*.....	4,136	276	4,412
1911*.....	3,938	308	4,246
1912*.....	2,822	238	3,060

* Includes Canadian output.

† Includes Canadian output and equipment built in company shops.

United States				Canadian			Grand
Year	Domestic	Foreign	Total	Domestic	Foreign	Total	Total
1913.....	2,559	220	2,779	517	....	517	3,296
1914.....	3,310	56	3,366	325	....	325	3,691
1915.....	1,852	14	1,866	83	....	83	1,949
1916.....	1,732	70	1,802	37	....	37	1,839
1917.....	1,924	31	1,955	45	....	45	2,000
1918.....	1,480	92	1,572	1	....	1	1,503
1919.....	306	85	391	160	....	160	551
1920.....	1,272	168	1,440	....	....	....	....
1921.....	1,275	39	1,314	361	....	361	1,675
1922.....	676	144	820	71	....	71	891
1923.....	1,507	29	1,536	....	....	....	....
1924.....	2,150	63	2,213	167	....	167	2,380

for the Illinois Central, in addition to 66 through line cars. Another large buyer was the New York Central Lines, which together placed orders for no less than 394 cars.

The feature of the passenger car business of the year was the comparatively even manner in which it was

spread throughout the twelve months' period, there being only one really poor month, namely, June.

Passenger car purchases at the present time continue in satisfactory volume. During the war period, passenger car purchases were small. In 1918, for example, there were orders for only 9 cars; in 1919, for only 292, and in 1921 for but 246. For the past three years the railways have had opportunity to catch up on requirements deferred during the extremely lean years. They have particularly made marked progress with reference to replacing wooden with steel equipment. Several large orders of cars for this purpose can be distinguished in the 1924 totals, notably the Illinois Central order mentioned, a Baltimore & Ohio order for 80 suburban cars, a Lackawanna order for 60, a Boston & Albany order for 50, etc. Furthermore, the Illinois Central and the Baltimore & Ohio orders were likewise made desirable because of electrification programs.

The lists of orders which follow are in two parts, one

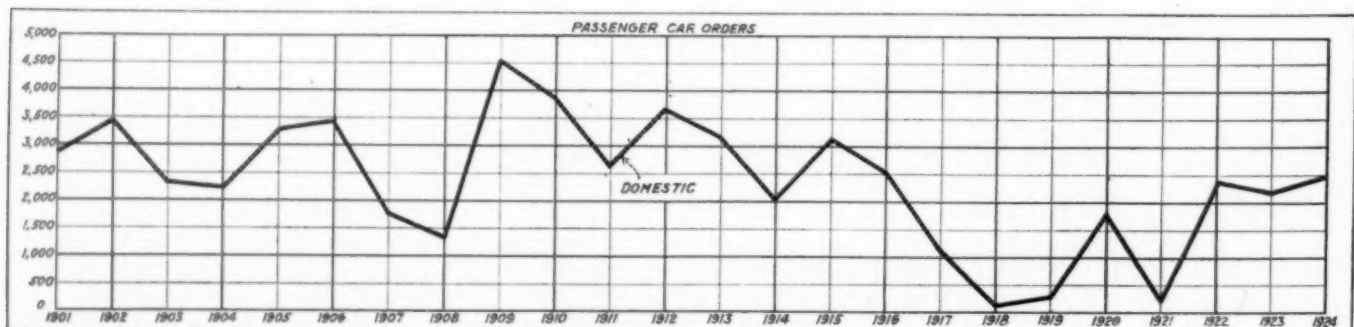
dealing with standard passenger train cars, and the other with gasoline, gas-electric or electric storage battery cars. The lists are compiled in the usual manner, returns from the railroad being checked with and amplified from lists of orders furnished by the builders, and from the weekly reports of orders in the Equipment and Supplies column of the *Railway Age*. The lists appear in the same form as in past years, except for the omission of the columns headed "Lighting." Inasmuch as practically all passenger cars are now electrically lighted this column was considered no longer necessary.

The tabulation of rail-motor cars is given heads relating particularly to that class of equipment. These heads are as follows: purchaser, number, motor or trailer, length, horsepower, seating capacity, weight, wheels, and builder. Of note in this list are orders for 21 cars placed by the New Haven and for 9 placed by the Erie, as well as the fact that the list becomes larger each year as more roads see the advantages of using this type of equipment.

Passenger Car Orders in 1924

For Service in the United States

Purchaser	No.	Class	Length	Construction	Seating capacity	Weight	Wheels per truck	Builder
Alabama & Vicksburg	1	Dining	70 ft. 0 in.	All Steel	30	140,000	6	Am. Car & Fdy.
Amer. Refr. Transit Co.	50	Exp. Refr.	.....	St. Und'frame	..	.....	..	General American
Atchison, Topeka & Santa Fe	10	Postal	63 ft. 8 3/4 in.	All Steel	..	110,000	4	Pullman
	10	Coaches	77 ft. 9 3/4 in.	All Steel	83	135,000	6	Pullman
	10	Smoking	77 ft. 9 3/4 in.	All Steel	85	135,000	6	Pullman
	10	Chair	77 ft. 9 3/4 in.	All Steel	75	140,000	6	Pullman
	10	Compt. Coaches	77 ft. 9 3/4 in.	All Steel	79	139,000	6	Pullman
	1	Dining	83 ft. 4 1/4 in.	All Steel	42	170,000	6	Pullman
	1	Buff & Libr.	83 ft. 4 1/4 in.	All Steel	49	165,000	6	Pullman
	2	Business	81 ft. 11 in.	All Steel	..	178,000	6	Pullman
	4	Business	59 ft. 8 1/4 in.	All Steel	..	140,000	4	Pullman
	20	Baggage	73 ft. 9 1/2 in.	All Steel	..	136,000	6	Pullman
Atlanta & West Point	2	Baggage	64 ft. 9 in.	St. Und'frame	..	.....	6	Company Shops
Atlantic Coast Line	10	Express	70 ft. 9 3/4 in.	All Steel	..	124,900	6	Standard Steel
	7	Mail & Exp.	70 ft. 9 3/4 in.	All Steel	..	129,000	6	Standard Steel
Baltimore & Ohio	5	Dining	79 ft. 1 1/2 in.	All Steel	36	169,000	6	Pullman
Bangor & Aroostook	4	Bagg. & Mail	69 ft. 0 in.	St. Und'frame	..	101,000	4	Company Shops
Bessemer & Lake Erie	6	Pass. & Bagg.	72 ft. 9 3/4 in.	All Steel	50	138,700	6	Pressed Steel
	3	Baggage	72 ft. 9 3/4 in.	All Steel	..	135,500	6	Pressed Steel
	3	Mail & Bagg.	72 ft. 9 3/4 in.	All Steel	..	142,500	6	Pressed Steel
Boston & Albany	50	Suburban	75 ft. 10 in.	All Steel	100	105,000	4	Osgood-Bradley
	3	Dining	80 ft. 3 3/4 in.	All Steel	36	164,000	6	Pullman
Central of Georgia	2	Compt. Coach	78 ft. 11 3/4 in.	All Steel	78	139,100	6	Pullman
	4	Coaches	78 ft. 11 3/4 in.	All Steel	82	139,400	6	Pullman
	2	Pass & Bagg.	76 ft. 4 1/4 in.	All Steel	46	136,800	6	Pullman
	4	Mail & Bagg.	73 ft. 10 3/4 in.	All Steel	..	134,900	6	Pullman
	3	Express	73 ft. 10 3/4 in.	All Steel	..	132,100	6	Pullman
	3	Coaches	78 ft. 11 3/4 in.	All Steel	82	.....	..	Pullman
	2	Coaches	78 ft. 11 3/4 in.	All Steel	78	.....	..	Pullman
	1	Mail & Bagg.	73 ft. 10 3/4 in.	All Steel	..	.....	..	Pullman
Central of New Jersey	23	Coaches	.....	All Steel	..	.....	..	Standard Steel
	5	Pass. & Bagg.	.....	All Steel	..	.....	..	Bethlehem Ship
	2	Club	.....	All Steel	..	.....	..	Bethlehem Ship
	1	Pass. & Bagg.	72 ft. 5 1/4 in.	All Steel	50	121,098	4	Pressed Steel
Central Vermont	6	Mail & Bagg.	.....	All Steel	..	.....	..	Am. Car & Fdy.
Chesapeake & Ohio	15	Express	70 ft. 8 in.	All Steel	..	131,700	6	Pressed Steel
	4	Dining	76 ft. 4 in.	All Steel	..	163,200	6	Pullman
Chicago & Alton	2	Café-Lounge	.....	All Steel	44	.....	6	Pullman
Chicago & North Western	24	Coaches	54 ft. 2 in.	All Steel	66	113,750	4	Am. Car & Fdy.
	12	Baggage	60 ft. 0 in.	All Steel	..	120,680	6	Am. Car & Fdy.
	11	Baggage	60 ft. 0 in.	All Steel	..	120,680	6	Pullman
	3	Mail & Bagg.	70 ft. 0 in.	All Steel	..	137,000	6	Am. Car & Fdy.
Chicago, Burlington & Quincy	5	Mail & Bagg.	70 ft. 8 3/4 in.	All Steel	..	148,800	6	Am. Car & Fdy.
	6	Dining	.....	.....	..	.....	..	Pullman
Cochran, Mr.	1	Business	82 ft. 11 1/4 in.	All steel	..	.....	6	Pullman
Chic. Ind. & Louisville	2	Milk	40 ft. 1 3/4 in.	St. Und'frame	..	60,000	4	Company Shops
	1	Baggage	60 ft. 0 in.	St. Und'frame	..	108,000	4	Company Shops



Passenger Car Orders, 1901 to 1924

Purchaser	No.	Class	Length	Construction	Seating capacity	Weight	Wheels per truck	Builder
Chic., Rock Island & Pacific	8	Dining	80 ft. 6 in.	All Steel	36	172,000	6	Pullman
.....	5	Buff.-Bagg.	75 ft. 0 in.	All Steel	12	158,000	6	Pullman
Cinn., New Orleans & Tex. Pac.	5	Coaches	79 ft. 9 1/4 in.	All Steel	83	136,500	6	Bethlehem Ship
Clev., Cinn., Chic. & St. Louis.	25	Coaches	70 ft. 0 in.	All Steel	85	131,400	4	Standard Steel
.....	5	Pass. & Bagg.	70 ft. 0 in.	All Steel	48	127,000	4	Pressed Steel
.....	10	Baggage	61 ft. 3 in.	All Steel	..	111,400	4	Am. Car & Fdy.
.....	10	Baggage	70 ft. 0 in.	All Steel	..	138,000	6	Am. Car & Fdy.
.....	5	Dining	72 ft. 6 in.	All Steel	36	168,400	6	Pullman
Colorado & Southern	1	Mail & Bagg.	70 ft. 0 in.	All steel	..	145,000	6	Am. Car & Fdy.
Delaware, Lackawanna & Western	50	Suburban	70 ft. 6 in.	All Steel	82	100,000	4	Pullman
.....	10	Suburban P. & B.	70 ft. 6 in.	All Steel	82	100,000	4	Bethlehem Ship
.....	30	Express	64 ft. 4 3/4 in.	All Steel	..	110,900	4	Pressed Steel
Duluth, So. Shore & Atlantic	4	Coaches	75 ft. 9 in.	All Steel	82	130,000	6	Pullman
.....	2	Bagg. & Mail	73 ft. 2 in.	All Steel	..	139,000	6	Pullman
El Paso & Southwestern	1	Dining	73 ft. 6 in.	All Steel	..	..	..	Am. Car & Fdy.
.....	3	Buff. Bagg.	75 ft. 0 in.	All Steel	..	..	..	Am. Car & Fdy.
Florida East Coast	3	Coaches	70 ft. 0 in.	All Steel	76	..	6	Pullman
.....	12	Coaches	..	..	..	..	..	Pullman
.....	1	Dining	..	..	..	..	..	Pullman
General Service	1	Dining	83 ft. 9 3/4 in.	All steel	36	..	6	Pullman
Georgia R. R.	2	Pass. & Bagg.	70 ft. 0 in.	St. Und'frame	42	..	4	Company Shops
Great Northern	10	Dining	83 ft. 9 3/4 in.	Steel Frame	36	181,200	6	Pullman
.....	50	Exp.-Refr.	52 ft. 9 3/4 in.	St. Und'frame	..	85,140	4	Siemens-Stemmel Co.
Gulf Coast Lines	2	Dining	73 ft.	All Steel	..	..	6	Am. Car & Fdy.
Illinois Central	30	Coaches	77 ft. 5 3/4 in.	All Steel	88	137,800	6	Pullman
.....	8	Part. Coach	77 ft. 5 3/4 in.	All Steel	86	137,800	6	Pullman
.....	3	Parlor	80 ft. 0 in.	All Steel	35	156,500	6	Pullman
.....	6	Chair	77 ft. 5 3/4 in.	All Steel	54	134,400	6	Am. Car & Fdy.
.....	9	Baggage	70 ft. 9 in.	All Steel	..	128,200	6	Am. Car & Fdy.
.....	10	Bagg. & Mail	70 ft. 9 in.	All Steel	..	132,500	6	Am. Car & Fdy.
.....	130	Sub-motor	72 ft. 4 in.	All Steel	84	125,000	4	Pullman
.....	85	Sub-trailer	72 ft. 4 in.	All Steel	84	84,000	4	Standard Steel
.....	200	Exp. Refr.	40 ft. 0 1/2 in.	St. Und'frame	..	66,000	..	Am. Car & Fdy.
International-Gt. Northern	3	Coaches	78 ft. 10 in.	All Steel	88	140,000	6	Am. Car & Fdy.
.....	2	Chair	78 ft. 10 in.	All Steel	68	140,000	6	Am. Car & Fdy.
.....	4	Baggage	73 ft. 4 in.	All Steel	..	133,000	6	Am. Car & Fdy.
.....	1	Mail & Bagg.	73 ft. 4 in.	All Steel	..	133,700	6	Am. Car & Fdy.
Kansas City Southern	1	Dynamometer	..	..	..	..	..	Burr Co.
Lehigh & Hudson River	10	Refr. Milk	..	..	..	..	..	Am. Car & Fdy.
Lehigh Valley	5	Coaches	75 ft. 6 in.	All Steel	80	130,000	4	Pullman
.....	3	Dining	79 ft. 0 in.	All Steel	30	153,000	6	Pullman
Long Island	40	Motor Coaches	63 ft. 4 3/4 in.	All Steel	78	114,705	4	Am. Car & Fdy.
Louisiana & Arkansas	1	Mail & Bagg.	70 ft. 0 in.	All Steel	..	..	6	Am. Car & Fdy.
Louisville & Nashville	2	Mail & Bagg.	72 ft. 8 3/4 in.	All Steel	..	138,600	6	Pressed Steel
.....	4	Mail & Bagg.	72 ft. 8 3/4 in.	All Steel	..	140,000	6	Pressed Steel
.....	8	Baggage	72 ft. 8 3/4 in.	All Steel	..	134,300	6	Pressed Steel
.....	4	Compt. Coach	77 ft. 9 3/4 in.	All Steel	80	145,200	6	Am. Car & Fdy.
.....	4	Coaches	77 ft. 9 3/4 in.	All Steel	82	144,500	6	Am. Car & Fdy.
.....	6	Compt. Coach	68 ft. 11 1/4 in.	All Steel	72	112,600	4	Am. Car & Fdy.
.....	6	Coaches	68 ft. 11 1/4 in.	All Steel	76	111,900	4	Am. Car & Fdy.
Louisville & Nashville	4	Coaches	..	..	..	..	..	Pressed Steel
.....	8	Mail & Bagg.	..	..	..	..	..	Pressed Steel
.....	4	Part. Coaches	..	..	..	..	..	Am. Car & Fdy.
.....	4	Baggage	..	..	..	..	..	Am. Car & Fdy.
.....	2	Dining Shells	..	..	..	..	..	Am. Car & Fdy.
Maine Central	6	Coaches	79 ft. 9 in.	All Steel	88	118,700	4	Osgood-Bradley
.....	3	Smoking	79 ft. 9 in.	All Steel	90	116,640	4	Osgood-Bradley
.....	4	Mail & Bagg.	63 ft. 3 3/4 in.	All Steel	..	116,700	4	Osgood-Bradley
Michigan Central	3	Dining	78 ft. 9 1/4 in.	All Steel	36	149,200	6	Pullman
.....	15	Coaches	78 ft. 7 3/4 in.	All Steel	85	133,800	4	Pullman
.....	20	Baggage	64 ft. 1 3/4 in.	All Steel	..	113,300	4	Am. Car & Fdy.
Missouri Pacific	2	Parlor	83 ft. 6 3/4 in.	Steel Frame	36	147,800	6	Pullman
.....	2	Dining	82 ft. 1 3/4 in.	Steel Frame	36	158,250	6	Am. Car & Fdy.
.....	50	Exp. Refr.	..	..	..	..	..	Gen'l American
Nashville, Chatt. & St. Louis.	4	Baggage	71 ft. 0 in.	All Steel	..	129,800	6	Am. Car & Fdy.
.....	3	Coaches	..	..	..	..	..	Pullman
Mobile & Ohio	1	Coach	75 ft. 9 1/4 in.	All Steel	83	136,500	6	Pullman
.....	1	Compt. Coach	75 ft. 9 1/4 in.	All Steel	81	140,000	6	Pullman
.....	2	Bagg. & Exp.	62 ft. 4 in.	All Steel	..	111,000	4	Pullman
.....	2	Mail & Bagg.	62 ft. 4 in.	All Steel	..	113,000	4	Pullman
New York Central	16	Dining	81 ft. 3 3/4 in.	All Steel	36	168,500	6	Pullman
.....	35	Coaches	77 ft. 9 3/4 in.	All Steel	85	133,000	4	Pullman
.....	25	Coaches	77 ft. 9 3/4 in.	All Steel	85	131,200	4	Standard Steel
.....	15	Coaches	77 ft. 9 3/4 in.	All Steel	85	131,400	4	Am. Car & Fdy.
.....	50	Baggage	63 ft. 3 3/4 in.	All Steel	..	112,100	4	Am. Car & Fdy.
.....	60	Exp. Refr.	52 ft. 3 3/4 in.	St. Und'frame	..	88,000	4	M. D. T. Co.
.....	18	Pass. & Bagg.	74 ft. 11 1/4 in.	All Steel	48	127,500	4	Pressed Steel
.....	28	Horse	72 ft. 9 1/4 in.	All Steel	..	142,000	6	Company Shops
N. Y., Chicago & St. Louis.	5	Coaches	74 ft. 8 3/4 in.	All Steel	80	125,500	4	Pullman
.....	4	Mail & Exp.	73 ft. 2 3/4 in.	All Steel	..	131,000	6	Pullman
.....	3	Auto Bagg.	73 ft. 2 3/4 in.	All Steel	..	130,000	6	Pullman
.....	1	Business	..	..	..	..	..	Pullman
.....	1	Dynamometer	..	..	..	..	..	Burr Co.
N. Y., N. H. & Hartford	3	Multiple Unit	71 ft. 11 in.	All Steel	106	175,500	4	Osgood-Bradley
N. Y., Westchester & Boston	10	M. U. Coaches	72 ft. 0 in.	All Steel	80	120,000	4	Pressed Steel
Northern Pacific	10	Baggage	70 ft. 10 in.	All Steel	..	138,900	6	Pullman
.....	10	Coaches	..	..	..	..	..	Pullman
.....	5	Baggage	..	..	..	..	..	Pullman
.....	5	Mail & Bagg.	..	..	..	..	..	Pullman
Panama	*1	Baggage	67 ft. 6 in.	St. Und'frame	72	29,000	4	Company Shops
.....	*1	Pay Car	67 ft. 6 in.	St. Und'frame	..	29,000	4	Company Shops
Pennsylvania	12	Dining	78 ft. 10 in.	All Steel	36	155,000	6	Altoona Wks.
Pittsburgh & Lake Erie	1	Dining	73 ft. 6 in.	All Steel	36	168,500	6	Pullman
Pullman Company	5	Bagg. Libr.	82 ft. 11 1/4 in.	All Steel	34	..	6	Pullman
.....	20	Obs. Sleeping	83 ft. 1/4 in.	All Steel	52	..	6	Pullman
.....	20	Sleeping	82 ft. 11 1/4 in.	All Steel	56	..	6	Pullman
.....	4	Obs. Parlor	83 ft. 1/4 in.	All Steel	..	..	6	Pullman
.....	6	Parlor	82 ft. 11 1/4 in.	All Steel	..	..	6	Pullman
.....	29	Parlor	82 ft. 11 1/4 in.	All Steel	34	..	6	Pullman
.....	25	Sleeping	82 ft. 11 1/4 in.	All Steel	56	..	6	Pullman
.....	20	Compt. Dwg. Rm.	82 ft. 11 1/4 in.	All Steel	48	..	6	Pullman
.....	6	Drwg. Room	82 ft. 11 1/4 in.	All Steel	56	..	6	Pullman
.....	9	Compt. Obs.	83 ft. 1/4 in.	All Steel	48	..	6	Pullman
.....	20	Sleeping	82 ft. 11 1/4 in.	All Steel	56	..	6	Pullman
.....	10	Bagg. Libr.	82 ft. 11 1/4 in.	All Steel	34	..	6	Pullman
.....	20	Sleeping	82 ft. 11 1/4 in.	All Steel	56	..	6	Pullman

Purchaser	No.	Class	Length	Construction	Seating capacity	Weight	Wheels per truck	Builder
Pullman Company—Continued	70	Sleeping	82 ft. 11¼ in.	All Steel	56	.....	6	Pullman
	200	Sleeping	82 ft. 11¼ in.	All Steel	56	.....	6	Pullman
	30	Sleeping	82 ft. 11¼ in.	All Steel	56	.....	6	Pullman
	3	Bagg. Libr.	82 ft. 11¼ in.	All Steel	26	.....	6	Pullman
	3	Obs. Parlor	83 ft. 6¼ in.	All Steel	32	.....	6	Pullman
	6	Dining	82 ft. 6 in.	All Steel	36	.....	6	Pullman
Reading Company	40	Coaches	72 ft. 4½ in.	All Steel	84	109,000	4	Bethlehem Ship
	20	Comb. Coaches	72 ft. 4½ in.	All Steel	56	109,000	4	Standard Steel
	20	Baggage	66 ft. 6½ in.	All Steel	..	107,400	4	Am. Car & Fdy.
Rich., Fredericksburg & Potomac	2	Coaches	83 ft. 10¾ in.	All Steel	86	140,000	6	Am. Car & Fdy.
	2	Express	71 ft. 5¾ in.	All Steel	..	132,000	6	Am. Car & Fdy.
	1	Postal	70 ft. 10 in.	All Steel	..	130,000	6	Am. Car & Fdy.
Richmond, Fdksburg & Potomac	1	Dining	83 ft. ¾ in.	All Steel	36	159,800	6	Pullman
Seaboard Air Line	6	Pass. & Bagg.	.....	.....	..	.....	..	Am. Car & Fdy.
	6	Mail & Bagg.	.....	.....	..	.....	..	Am. Car & Fdy.
	6	Express	.....	.....	..	.....	..	Am. Car & Fdy.
Southern Railway	20	Coaches	75 ft. 9¼ in.	All Steel	83	136,500	6	Bethlehem Ship
	12	Bagg. & Exp.	62 ft. 4 in.	All Steel	..	111,000	4	Am. Car & Fdy.
	6	Mail & Bagg.	62 ft. 4 in.	All Steel	..	113,000	4	Am. Car & Fdy.
	2	Postal	62 ft. 4 in.	All Steel	..	113,000	4	Am. Car & Fdy.
	5	Dining	79 ft. 11¼ in.	All Steel	36	156,500	6	Pullman
	25	Coaches	75 ft. 9¼ in.	All Steel	83	136,500	6	Pullman
	10	Bagg. & Exp.	62 ft. 4 in.	All Steel	..	111,000	4	Pullman
	3	Dining	79 ft. 11¼ in.	All Steel	36	156,500	6	Pullman
	3	Dining	82 ft. 1½ in.	All Steel	36	160,000	6	Pullman
	7	Bagg. & Exp.	.....	.....	..	.....	..	Pullman
Southern Pacific	15	Dining	77 ft. 0 in.	.....	..	.....	..	Pullman
	23	Baggage	70 ft. 0 in.	.....	..	.....	..	Bethlehem Ship
	6	Bagg.-Horse	.....	.....	..	.....	..	Am. Car & Fdy.
	7	Club	.....	.....	..	.....	..	Am. Car & Fdy.
	10	Interurban	72 ft. 0 in.	.....	..	.....	..	Pullman
	4	Coaches	72 ft. 0 in.	All Steel	..	139,589	4	Standard Steel
	5	Chair	60 ft. 0 in.	All Steel	..	112,117	4	Standard Steel
	4	Mail & Bagg.	70 ft. 0 in.	All Steel	..	130,353	4	Standard Steel
Staten Island Rapid Transit	80	Elec. Suburban	57 ft. 0 in.	All Steel	71	95,000	4	Standard Steel
Texas & Pacific	10	Bagg. & Exp.	70 ft. 0 in.	All Steel	..	121,500	6	Am. Car & Fdy.
	3	Bagg. & Mail	70 ft. 0 in.	All Steel	..	124,300	6	Am. Car & Fdy.
Virginian	1	Business	.....	.....	..	.....	..	Bethlehem Ship
Wabash	10	Baggage	73 ft. 6¼ in.	All Steel	..	124,000	6	Am. Car & Fdy.
	5	Chair	80 ft. 4 in.	All Steel	72	146,500	6	Am. Car & Fdy.
	2	Dining	80 ft. 10 in.	All Steel	36	158,700	6	Am. Car & Fdy.
	3	Pass. & Bagg.	77 ft. 9½ in.	All Steel	34	136,000	6	Am. Car & Fdy.

Canada

Canadian National	10	Coaches	73 ft. 6 in.	All Steel	..	.....	6	Can. Car & Fdy.
	10	Coaches	73 ft. 6 in.	All Steel	..	.....	6	Can. Car & Fdy.
	2	Parlor	73 ft. 6 in.	All Steel	..	.....	6	Can. Car & Fdy.
	2	Parlor	73 ft. 6 in.	All Steel	..	.....	6	Can. Car & Fdy.
	20	Coaches	73 ft. 6 in.	All Steel	83	153,800	6	Can. Car & Fdy.
	15	Mail & Exp.	73 ft. 6 in.	All Steel	..	148,400	6	Can. Car & Fdy.
	6	Parlor	75 ft. 6 in.	All Steel	41	146,600	6	Can. Car & Fdy.
	4	Parlor	75 ft. 6 in.	All Steel	36	166,700	6	Can. Car & Fdy.
	20	Baggage	73 ft. 6 in.	All Steel	..	140,500	6	National Steel
	7	Baggage	73 ft. 6 in.	All Steel	..	150,600	6	National Steel
	4	Pass. & Bagg.	73 ft. 6 in.	All Steel	38	148,200	6	National Steel
Canadian Pacific	*8	Bagg. & Smok.	Frames only	All Steel	..	.....	6	Can. Car & Fdy.
	*5	Par. Buff.	Frames only	All Steel	..	.....	6	Can. Car & Fdy.

Export

Central of Brazil	6	1st C. Coaches	.....	.....	..	.....	..	Am. Car & Fdy.
Cuba R. R.	2	1st C. Coach	70 ft. 0 in.	Steel Frame	54	89,000	4	Am. Car & Fdy.
	5	2nd C. Coach	70 ft. 0 in.	Steel Frame	70	89,000	4	Am. Car & Fdy.
Cuba Northern	6	2nd C. Coaches	63 ft. 0 in.	.....	..	.....	..	Am. Car & Fdy.
	1	Mail & Bagg.	.....	.....	..	.....	..	Am. Car & Fdy.
Netherland State Rys.	*15	1,500 Volts	D. C.	Multiple Unit—Equipments only				West'h's Elec.
Pacifico, F. C. del (Colombia)	5	1st C. Coach	41 ft.	St. Und'frame	50	.....	4	Wason Mfg. Co.
Shinano Ry. (Japan)	*4	1,500 Volts	D. C.	Multiple Unit—Equipments only				West'h's Elec.

* Not included in totals.

Orders for Gasoline, Gas-Electric or Storage Battery Rail Motor Cars

Purchaser	No.	Motor or Trailer	Length	Horse-power	Seating capacity	Weight	Wheels	Builder
Am. R. R. of Porto Rico	3	Coaches	57 ft. 0 in.	.....	46	33,141	.....	Wason Mfg. Co.
Asherton & Gulf	1	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
Atlantic & Western	1	Motor	32 ft.	75	30	19,000	4 & 4	Edwards
Ratesville Southwestern	1	Motor	24 ft. 0 in.	.....	20	6,000	.....	Ford
Blue Ridge	2	Motor	.....	.....	.....	.....	.....	Edwards
Boston & Maine	1	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
	1	Motor	51 ft. 2¼ in.	225	30	40,000	4 & 4	Sykes
	1	Trailer	45 ft. 5½ in.	.....	52	27,000	4 & 4	Sykes
Cape Fear	2	Motor	34 ft. 0 in.	75	40	20,000	4 & 4	Edwards
Caro Northern	1	Motor	.....	.....	.....	.....	.....	Edwards
Chicago & North Western	1	Motor	70 ft. 0 in.	208	32	66,000	4 & 4	Oneida Mfg. Co.
	1	Motor	70 ft. 0 in.	140	62	67,000	4 & 4	Oneida Mfg. Co.
Chicago, Burlington & Quincy	3	Motor	43 ft. (2)	60	41	41,600	4 & 4	Edwards
Chicago Great Western	2	Motor	44 ft. 7 in.	245	30	30,000	4 & 4	Sykes
	2	Trailer	39 ft. 4 in.	.....	44	21,000	4 & 4	Sykes
Chicago, Rock Island & Pacific	1	Motor	37 ft. 7¾ in.	60	41	22,500	4 & 4	International Motor Co.
	1	Motor	54 ft. 0 in.	120	44	48,000	4 & 4	International Motor Co.
Clinton & Oklahoma Western	1	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
Clev., Cinn., Chic. & St. Louis	2	Motor	35 ft. 0 in.	225	.....	.....	4 & 4	Sykes
	2	Trailer	28 ft. 0 in.	.....	60	.....	4 & 4	Sykes
	1	Motor	35 ft. 0 in.	150	.....	.....	4 & 4	Sykes
	2	Motor	35 ft. 0 in.	225	.....	.....	4 & 4	Sykes
	2	Trailer	28 ft. 0 in.	.....	.....	.....	4 & 4	Sykes
Danaville & Mt. Morris	1	Motor	51 ft. 0 in.	206	50	48,000	4 & 4	Edwards
Duluth, Missabe & Nor.	1	Motor	70 ft. 0 in.	140	64	67,000	4 & 4	Oneida Mfg. Co.
Erie	7	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
	2	Motor	55 ft. 0 in.	250	50	50,000	4 & 4	J. G. Brill Co.

Purchaser	No.	Motor or Trailer	Length	Horse-power	Seating capacity	Weight	Wheels	Builder
Gulf, Mobile & Northern.....	1	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
	1	Trailer	34 ft. 0 in.	....	36	24,000	4 & 4	J. G. Brill Co.
Gulf, Texas & Western.....	1	Motor Bagg.	43 ft. 6 in.	70	....	29,000	4 & 4	J. G. Brill Co.
	1	Motor Bagg.	55 ft. 0 in.	250	....	50,000	4 & 4	J. G. Brill Co.
International-Gt. Northern	2	Motor	42 ft. 7 in.	68	47	32,000	4 & 4	J. G. Brill Co.
	1	Motor B. & M.	42 ft. 7 in.	68	....	31,000	4 & 4	J. G. Brill Co.
	1	Trailer	42 ft. 7 in.	....	54	29,000	4 & 4	J. G. Brill Co.
Jonesboro, Lake City & Eastern.....	1	Gas-Electric	60 ft. 0 in.	175	50	96,000	4 & 4	General Electric
	1	Gas-Electric	70 ft. 0 in.	175	91	96,000	4 & 4	General Electric
Louisiana & Northwest.....	1	Motor	55 ft. 0 in.	250	50	50,000	4 & 4	J. G. Brill Co.
Minn. Dak. & Western.....	1	Motor	68 ft. 0 in.	140	38	65,000	4 & 4	Oneida Mfg. Co.
Missouri-Kansas-Texas	1	Motor	55 ft. 0 in.	250	50	50,000	4 & 4	J. G. Brill Co.
	1	Trailer	50 ft. 0 in.	....	60	30,000	4 & 4	J. G. Brill Co.
Missouri Pacific	3	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
Missouri Southern	1	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
Nashville, Chattanooga & St. Louis..	1	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
New Orleans & Lower Coast.....	1	Motor	40 ft. 0 in.	90	36	26,000	2 & 2	F. W. D. Auto Co.
	2	Trailer	40 ft. 0 in.	....	40	22,000	2 & 2	F. W. D. Auto Co.
New York Central.....	1	Motor	55 ft. 0 in.	250	50	50,000	4 & 4	J. G. Brill Co.
	1	Mo.or	55 ft. 0 in.	150-200	....	55,000	4 & 4	J. G. Brill Co.
	1	Trailer	50 ft. 0 in.	....	60	30,000	4 & 4	J. G. Brill Co.
N. Y., N. H. & Hartford.....	10	Motor	42 ft. 7 in.	150	45	35,000	4 & 4	Sykes
	10	Motor	42 ft. 0 in.	150	45	34,000	4 & 4	J. G. Brill Co.
	1	Gas-Electric	62 ft. 2 in.	250	65	70,000	4 & 4	J. G. Brill Co.
New York, Ontario & Western.....	1	Motor	41 ft. 10 in.	150	38	24,000	4 & 4	Sykes
Northern Pacific	1	Gas-Electric	59 ft. 4 in.	175	59	78,400	4 & 4	Electro-Motive Co.
	1	Motor	58 ft. 10 in.	104	33	73,000	4 & 4	Oneida Mfg. Co.
	3	Gas-Electric	59 ft. 4 in.	175	58	78,400	4 & 4	Electro-Motive Co.
Pacific & Idaho.....	1	Motor	33 ft. 0 in.	80	33	16,400	4 & 4	Calif. Body Bldg. Co.
Pennsylvania	1	Motor	43 ft. 6 in.	70	38	30,000	4 & 4	J. G. Brill Co.
	2	Motor	44 ft. 5 in.	150	38	34,000	4 & 4	J. G. Brill Co.
	1	Trailer	18 ft. 6 in.	....	....	5,000	2 & 2	J. G. Brill Co.
Pittsburgh, Lisbon & Western.....	1	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
Punxiana Coal Co.....	1	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
Rio Grande	1	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
San Antonio, Uvalde & Gulf.....	1	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
Sugar Land Ry.....	1	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
Tennessee, Kentucky & Northern....	1	Motor	32 ft.	75	30	19,000	4 & 4	Edwards
Virginia & Carolina Southern.....	1	Motor	32 ft.	75	34	19,000	4 & 4	Edwards
Virginia & Rainy Lake.....	1	Motor	14 ft. 0 in.	45	14	7,500	2 & 2	Oneida Mfg. Co.
West Phila. & Reading.....	1	Gas-Electric	....	....	....	....	....	J. G. Brill Co.
	1	Trailer	....	....	....	....	....	J. G. Brill Co.
Wichita Falls & Southern.....	1	Motor	43 ft. 6 in.	70	38	29,000	4 & 4	J. G. Brill Co.
	1	Motor Bagg.	55 ft. 0 in.	250	....	50,000	4 & 4	J. G. Brill Co.
	1	Trailer	55 ft. 0 in.	....	60	30,000	4 & 4	J. G. Brill Co.
Wilmington, Brunswick & So.....	1	Motor	32 ft.	75	28	19,000	4 & 4	Edwards
	1	Trailer	34 ft.	....	40	16,000	4 & 4	Edwards
	1	Frt. Trailer	25 ft.	....	....	12,500	4 & 4	Edwards
Yadkin R.R.	1	Motor	....	....	....	....	....	Edwards
Canada								
Canadian National	2	Stor. Bat'y	....	....	....	....	....	International Equip.
Canadian National	*2	Diesel-Elec.	Equipments only	....	....	....	....	Westinghouse Electric
Canadian Pacific	1	Stor. Bat'y Coach	52 ft. 3 in.	All Steel	50	71,200	4	International Equip.
Crows Nest Pass Coal Co.....	1	Motor	....	....	30	....	....	Edwards
	1	Trailer	....	....	34	....	....	Edwards
Morrissey, Fernie & Michel.....	1	Motor	32 ft. 0 in.	75	30	19,000	4 & 4	Edwards
	1	Trailer	32 ft. 0 in.	....	34	15,000	4 & 4	Edwards
	1	Motor	43 ft. 0 in.	(2)100	50	41,000	4 & 4	Edwards
Temiskaming & Northern Ontario....	1	Pass. & Bagg.	55 ft. 0 in.	Steel	....	....	....	Ry. Stor. Bat'y Car
	1	Pass. & Bagg.	55 ft. 0 in.	....	....	....	....	Ry. Stor. Bat'y Car

Equipment Purchased in 1924 Totaled \$467,460,540

The domestic orders placed in 1924 for steam railroad locomotives, freight cars and passenger cars (exclusive of Canadian and export business), are estimated by the *Railway Age* to have a total value as follows:

Locomotives—Number ordered, 1,413; Estimated value.....	\$88,595,100
Freight cars—Number ordered, 143,728; Estimated value.....	306,140,640
Passenger cars—Number ordered, 2,554; Estimated value.....	70,474,800
Rail Motor cars—Number ordered, 120; Estimated value.....	2,250,000
Total estimated value of 1924 equipment purchases.....	\$467,460,540

Material Costs Lower in 1924



Study of market conditions discloses growing stability of industry and decreased price ranges

By W. S. Lacher and E. L. Woodward

A STUDY of markets and commodity price ranges during the five years ending with December, 1924, affords ample justification for a favorable outlook on the future. The years 1920 and 1921 witnessed a profound inflation, followed by an equally marked depression. The three subsequent years present an optimistic yet conservative aspect that cannot but inspire confidence in the continued prosperity of the American people.

This confidence in the fundamental soundness of American commerce and industry has been manifested during the last two years under conditions presenting a striking contrast and has had a wholesale stabilizing influence. Thus the beginning of 1923 found many alarmed at the prospect of a runaway market because prices had advanced steadily throughout nearly all the preceding year and were still on a definitely upward trend. But a firm conservatism allayed any tendency towards frenzied buying with the result that the steady rise of prices ended in the spring. The market remained remarkably stable on a rather high level throughout the greater part of the year with some recession in prices towards its close. Thus the opening of 1924 presented almost the reverse of the condition 12 months earlier. The evident weakness of prices naturally bred some distrust which was intensified by a continued decline throughout the first half of 1924. But again, thanks to a prevailing common sense, business continued stable. With an advance in the prices of farm products late in the summer, buying increased and prices took a moderately upward trend, a tendency which was further influenced by the outcome of the election. Renewed energy became manifest in all directions.

Comparing actual prices of 1924 with those of the preceding year we find that the general level of prices was lower during the last 12 months. This was more true of

certain commodities and certain producing localities than of others. For example, in the lumber market of the northwest prices were depressed to a marked degree. On the other hand, in the iron and steel market the recession was very gradual and did not cease until late in the fall, the upward turn lagging considerably behind the increased buying tendency. Obviously in a territory as large as the American continent and presenting as wide a diversity of conditions, the aspect of the material market presents

some marked departures from the general tendency. It is therefore necessary to consider the markets of the primary materials individually.

Iron and Steel

Prices Lower

No better evidence of the fundamental stability of American business is to be had than that afforded by a review of the market conditions in the iron and steel industry during the past year, in spite of a marked decrease in sales. The extent of the curtailment of buying is evidenced by the

fact that on July 31, 1924, the unfilled orders on the books of the United States Steel Corporation totaled 3,187,072 tons, the lowest figure since May, 1911, and considerably less than half of the volume of business on the books on July 31, 1923. This reflects the disparity between demand and production in spite of the fact that the output was reduced to approximately 50 per cent of capacity for a considerable period. Railroad buying was at a particularly low level during the summer months. The consumption of steel by the automobile industry was also restricted. The automotive manufacturers had made preparations early in the year for sales equal to or greater than those in 1923, but a considerable falling off in demand compelled them to curtail production and postpone deliveries of steel. Activity in the field of building, on the other hand, gave rise to a much more steady demand for

The trend of material prices in the year just closed was the direct reverse of that prevailing in the preceding 12 months. In 1923 prices advanced moderately in the early months, remained practically stationary during the summer and declined late in the fall. During 1924, prices declined during the first half of the year, maintained a uniform level during the summer and early fall and turned moderately upward in the last two months.

The general level of prices in 1924 was moderately lower than in 1923, but market tendencies indicate a somewhat higher level of prices early in 1925.

structural steel than during the previous year, with the result that the aggregate tonnage of contract awards for the first 10 months of 1924 was 1,742,000 tons, as compared with 1,648,400 tons for the same period of 1923.

Considering the effects of these conditions on prices we find that during the first three or four months of the year

the prices were generally stable, followed by a period of uncertainty, during which they were not well defined, concessions from published quotations being made to favored buyers. But by May lower prices were more widely quoted, with further recessions in subsequent months.

FREIGHT CAR PRICES IN 1924

Road	No.	Type	Capacity	Construction	Builder	Unit Price	Total Approximate Cost	Order Placed	Equipment Trust Application Decided
Ann Arbor	250	Auto. Box	40-ton	St. Unf.	Standard Tank	\$2,300	\$575,000	Dec. 15, 1923	Jan. 19
	250	S. S. Box	40-ton	St. Unf.	Standard Tank	2,200	550,000	Dec. 15, 1923	Jan. 19
Boston & Albany	1,000	Box	110,000	Steel	Am. C. & F.	2,607	2,607,060	March, 1924	Sept. 27
Central Vermont	200	Box (Value as rebuilt)			Am. C. & F.	1,504	300,712	September, 1924	Oct. 6
	100	Box (Value as rebuilt)			Am. C. & F.	1,596	159,647	September, 1924	Oct. 6
	200	Box	40-ton	St. Frame	Am. C. & F.	2,225	445,000	September, 1924	Oct. 6
Chesapeake & Ohio	1,000	Auto.	40-ton	St. Frame	Ill. Car.	2,218	2,217,610	April	July 5
	2,000	Gondola	57½-ton	Steel	Std. Steel				
	1,000	Gondola	57½-ton	Steel	Am. C. & F.				
	1,000	Gondola	57½-ton	Steel	Gen. Am.	2,117	11,642,745	April	July 5
	1,000	Gondola	57½-ton	Steel	Newport News				
	500	Gondola	57½-ton	Steel	Ill. Car.				
	600	Ballast	57½-ton	Steel	Am. C. & F.	2,279	1,367,670	April	July 5
	100	Caboose		St. Frame	Std. Steel	2,635	263,539	June	July 5
Cleve., Cin., Chic. & St. Louis	600	Box	55-ton	Steel	Am. C. & F.	2,620	1,571,712	February	Sept. 27
	1,000	Hopper	70-ton	Steel	Pressed Steel	2,408	2,408,150	February	Sept. 27
	500	Hopper	70-ton	Steel	Std. Steel	2,409	1,204,400	February	Sept. 27
Duluth, South Shore & Atlantic	190	Refrig.	35-ton	St. Unf.	M. D. T. Co.	3,100	589,000	February	Sept. 27
Florida East Coast	200	Flat	40-ton	St. Unf.	Pullman	1,635	327,000	July	Sept. 12
	20	D. S. Box	40-ton	St. Unf.	Mt. Vernon	2,627	525,400	May	July 10
	100	Caboose		St. Unf.	Mt. Vernon	3,800	76,000	May	July 10
	100	Ballast	40-ton	Wood	Am. C. & F.	2,000	200,000	June	July 10
Georgia, Southern & Florida	1,000	D. S. Box	40-ton	St. Ct. Sl.	Am. C. & F.	1,600	1,600,000	November	Nov. 17
Great Northern	2,000	Refrig.				2,200	4,400,000		July 1
Illinois Central	1,000	Gondola	50-ton	St. Unf.	Pullman				
	1,000	Gondola	50-ton	St. Unf.	Pressed Steel				
	1,000	Gondola	50-ton	St. Unf.	Gen'l Am.	2,028	8,112,000	Sept. 13, 1924	Dec. 10
	500	Gondola	50-ton	St. Unf.	Ryan				
	500	Gondola	50-ton	St. Unf.	Mt. Vernon				
	1,000	Box	40-ton	St. Unf.	Std. Steel	2,230	4,460,000	Sept. 13, 1924	Dec. 10
	1,000	Box	40-ton	St. Unf.	Am. C. & F.				
Maine Central	200	Stock	40-ton	St. Unf.	Am. C. & F.	2,005	401,000	Sept. 13, 1924	Dec. 10
	100	Gondola	50-ton	Steel	Std. Steel	2,354	235,400	March	May 14
	250	S. S. Box	40-ton	St. Frame	Laconia	2,400	600,000	March	May 14
Michigan Central	1,000	Box	55-ton	Steel	{ Am. C. & F. or } Std. Steel	2,609	2,608,700	February	Sept. 27
Missouri Pacific	250	Auto.	40-ton	St. Frame	Am. C. & F.				
	250	Auto.	40-ton	St. Frame	Gen. Am.	2,027	2,026,830	August	Nov. 26
	500	Auto.	40-ton	St. Frame	Std. Tank				
	75	Caboose		St. Unf.	Am. C. & F.	2,527	189,530	October	Nov. 26
Mobile & Ohio	595	D. S. Box	40-ton	St. C. S.	Am. C. & F.	1,600	952,000	November	Nov. 1
	200	D. B. Gondola	50-ton	St. Frame	Gen'l Am.	1,700	340,000	November	Nov. 1
	150	Stock	40-ton	St. C. S.	Tenn. C. I.	1,605	240,750	November	Nov. 1
	150	Hopper	50-ton	St. Frame	Kilby	1,481	222,150	November	Nov. 1
New Orleans, Texas & Mexico	500	S. S. Box	40-ton	St. Unf.	Am. C. & F.	1,793	896,690	October	Nov. 25
	500	S. S. Auto.	40-ton	St. Frame	Pullman	1,958	979,205	October	Nov. 25
	250	Gondola	40-ton	St. Unf.	Mt. Vernon	1,427	356,645	October	Nov. 25
New York Central	1,400	Box	55-ton	Steel	Am. C. & F.	2,609	3,652,684	February	June 2
	1,000	Auto. Box	55-ton	Steel	Pressed Steel	2,704	2,703,680	February	June 2
	2,400	Hopper	70-ton	Steel	Std. Steel	2,403	5,767,344	February	June 2
	500	Refrig.	35-ton	St. Unf.	M. D. T. Co.	3,100	1,550,000	February	June 2
	600	Box	55-ton	Steel	Am. C. & F.	2,609	1,565,436	February	Sept. 27
	2,600	Hopper	70-ton	Steel	Std. Steel	2,403	6,247,956	February	Sept. 27
New York, Chicago & St. Louis	1,000	S. S. Auto.	40-ton	St. Unf.	Ill. Car.	2,000	2,000,000	March	Feb. 19
	300	D. D. Stock	40-ton	St. Unf.	Gen'l-Am.	1,650	495,000	March	Feb. 19
New York, Susquehanna & Western	225	Hopper	50-ton	Steel	(Value as rebuilt)	1,769	398,124	March	Dec. 17
Pennsylvania	1,000	D. S. Box	50-ton	Steel	Newport News				
	2,000	D. S. Box	50-ton	Steel	Std. Steel				
	3,000	D. S. Box	50-ton	Steel	Pressed Steel	2,134	23,472,910	March	Apr. 28
	2,000	D. S. Box	50-ton	Steel	Am. C. & F.				
	2,000	D. S. Box	50-ton	Steel	Pullman				
	1,000	D. S. Box	50-ton	Steel	Bethlehem				
	500	D. D. Stock	50-ton	Steel	Gen. Amer.				
	500	D. D. Stock	50-ton	Steel	Ill. Car.	1,852	1,852,280	March	Apr. 28
	2,500	Box	50-ton	Steel	Bethlehem				
	2,500	Box	50-ton	Steel	Pressed Steel	2,111	21,112,000	September	Oct. 10
	2,500	Box	50-ton	Steel	Am. C. & F.				
	2,500	Box	50-ton	Steel	Std. Steel				
Rutland	300	D. S. Box	40-ton	St. Unf.	Youngstown	2,183	654,879	February	May 16
	200	D. S. Box	40-ton	St. Unf.	Youngstown	2,248	449,588	February	May 16
St. Louis Southwestern	500	D. S. Box	40-ton	St. Unf.	{ Am. C. & F. and } { Mt. Vernon }	2,400	2,400,000	{ Jan., 1924 } { Dec., 1923 }	Feb. 19
Seaboard Air Line	25	Caboose		St. Unf.		3,650	91,250		Mar. 6
Southern	2,000	Box	40-ton	St. Unf.	Am. C. & F.	1,840	3,680,000	Dec., 1923	Mar. 31
	500	Hopper	50-ton	St. Frame	Std. Steel	1,647	823,500	March, 1924	Mar. 31
	1,000	Gondola	50-ton	Steel	Tenn. C. I.	1,630	1,630,000	March, 1924	Mar. 31
	2,000	D. S. Box	40-ton	St. C. S.	{ Am. C. & F. }	1,600	4,800,000	October	Oct. 15
	1,000	D. S. Box	40-ton	St. C. S.	{ Mt. Vernon }				
	250	Stock	40-ton	St. C. S.	Tenn. C. I.	1,605	401,250	October	Oct. 15
	250	Flat	50-ton	St. Unf.	Am. C. & F.	1,380	345,000	October	Oct. 15
Southern Pacific	2,900	Box	50-ton	St. Unf.	Std. Steel	2,267	6,574,700	December, 1923	May 14
	500	T. B. Gondola		St. Unf.	Ralston	1,820	910,000	December, 1923	May 14
	250	Stock		St. Unf.	Ralston	1,991	497,750	December, 1923	May 14
	450	Flat		St. Unf.	Ralston	1,691	760,800	December, 1923	May 14
	500	Flat		St. Unf.	Co. shops	1,453	726,500	December, 1923	May 14
	200	Tank	12,500-g.	Wood	Gen'l-Am. Tank	2,506	501,200	December, 1923	May 14
	500	Logging		St. Unf.	Co. shops	1,540	770,000	December, 1923	May 14
	600	D. B. Gondola		St. Unf.	Gen'l-Am.	2,358	1,414,800	December, 1923	May 14
	500	Auto.		St. Unf.	Pullman	2,710	1,355,000	December, 1923	May 14
	90	Caboose		St. Unf.	Co. shops	3,162	284,600	December, 1923	May 14
	40	Dump		Steel	Kil. & Jac.	3,900	156,000	October, 1923	May 14
Texas & Pacific	1,000	D. S. Auto.	40-ton	St. Unf.	{ Am. C. & F. and } { Pullman }	2,137 2,011	2,136,820 2,011,150	September September	Nov. 26 Nov. 26
Union Pacific	1,000	D. S. Auto.	40-ton	St. Unf.	{ Am. C. & F. }	2,403	1,201,500	Jan.-Feb., 1924	Mar. 29
	250	Tank	12,500-g.	Steel	Gen. Am. Tank				
	250	Tank	12,500-g.	Steel	Am. C. & F.	3,262	2,528,290	January, 1924	Apr. 25
Western Pacific	775	Refrig.	40-ton	St. Unf.	Std. Tank	2,678	535,624	January, 1924	Apr. 25
	200	D. S. Auto.	50-ton	St. Unf.	Pac. C. & F.	1,213	121,300	February, 1924	Apr. 25
	100	Logging	35-ton	Wood		14,750	14,750		Apr. 25
	1	Spreader		Steel	Std. Steel	2,124	2,124,000	October	Dec. 16
Wheeling & Lake Erie	1,000	Box	50-ton	Steel					

PASSENGER CAR PRICES IN 1924

Road	No.	Class	Construction	Length	Weight	Builder	Unit Price	Total Approximate Cost	Order Reported in Railway Age	Equipment Trust Application Decided
Baltimore & Ohio.....	30	Elec. Pass.	Steel	67 ft.	95,000	Std. Steel.....	32,758	2,620,600	Aug. 30, 1924	Oct. 22
Boston & Albany.....	3	Dining	Steel	80 ft.	164,000	Pullman.....	49,400	148,200	Feb. 23, 1924	Sept. 27
Central of Georgia.....	50	Suburban	Steel	76 ft.	105,000	Osg-Bradley.....	21,984	1,099,214	May 17, 1924	Sept. 27
	4	Coaches	Steel	79 ft.	139,400	Pullman.....	30,806	123,224	Jan. 26, 1924	Mar. 4
	2	Compt. Coach	Steel	79 ft.	139,100	Pullman.....	31,456	62,912	Jan. 26, 1924	Mar. 4
	4	Bagg. & Mail	Steel	74 ft.	134,900	Pullman.....	26,709	106,836	Jan. 26, 1924	Mar. 4
	3	Bagg. & Exp.	Steel	74 ft.	132,100	Pullman.....	24,096	72,288	Jan. 26, 1924	Mar. 4
	2	Pass. & Bagg.	Steel	76 ft.	136,800	Pullman.....	29,665	59,330	Jan. 26, 1924	Mar. 4
Central of New Jersey.....	25	Coaches	Steel	72 ft.	117,500	Std. Steel.....	24,012	600,292	Nov. 17, 1923	May 1
	25	Coaches	Steel	72 ft.	117,500	Std. Steel.....	24,015	600,367	Nov. 17, 1923	May 1
	5	Pass. & Bagg.	Steel	72 ft.	117,000	Pressed Steel.....	22,084	110,421	Nov. 17, 1923	May 1
	5	Bagg. & Exp.	Steel	74 ft.	142,500	Am. C. & F.....	21,651	108,255	Nov. 17, 1923	May 1
	5	Bagg. & Exp.	Steel	74 ft.	142,500	Am. C. & F.....	20,505	102,524	Nov. 17, 1923	May 1
Chesapeake & Ohio.....	15	Express	Steel	71 ft.	131,700	Pressed Steel.....	20,909	313,639	Apr. 26, 1924	July 5
	4	Dining	Steel	76 ft.	163,200	Pullman.....	44,395	177,578	May 17, 1924	July 5
Cin., Georgetown & Portsmouth	2	Gas. Rail Motor	.....	.....	.....	.....	11,680	23,360	.....	May 8
Clev., Cin., Chicago & St. Louis	25	Coaches	Steel	70 ft.	131,400	Std. Steel.....	27,800	694,900	.....	Sept. 27
	10	Baggage	Steel	61 ft.	111,400	Am. C. & F.....	18,986	189,556	Feb. 23, 1924	Sept. 27
	10	Baggage	Steel	70 ft.	138,000	Am. C. & F.....	21,465	214,651	.....	Sept. 27
	5	Dining	Steel	72 ft.	168,400	Pullman.....	49,360	246,800	Mar. 1, 1924	Sept. 27
	5	Pass. & Bagg.	Steel	70 ft.	127,000	Pressed Steel.....	26,400	131,999	.....	Sept. 27
Duluth, So. Shore & Atl.....	4	Coaches	Steel	67 ft.	130,000	Pullman.....	26,560	106,244	Aug. 2, 1924	Sept. 12
	2	Bagg. & Mail	.....	70 ft.	139,000	Pullman.....	32,225	46,450	Aug. 2, 1924	Sept. 12
Florida East Coast.....	3	Coaches	Steel	70 ft.	.....	Pullman.....	32,004	96,010	May 24, 1924	July 10
Illinois Central.....	200	Exp. Refrig.	St. Unf.	40 ft.	66,000	Am. C. & F.....	4,588	917,600	Sept. 20, 1924	Dec. 10
	30	Coaches	Steel	77 ft.	137,800	Pullman.....	26,225	786,750	Oct. 18, 1924	Dec. 10
	8	Compt. Coaches	Steel	77 ft.	137,800	Pullman.....	27,600	220,800	Oct. 18, 1924	Dec. 10
	3	Parlor	Steel	80 ft.	156,500	Pullman.....	38,000	114,000	Dec. 13, 1924	Dec. 10
	6	Chair	Steel	77 ft.	134,400	Pullman.....	28,434	170,604	Oct. 18, 1924	Dec. 10
	9	Baggage	Steel	71 ft.	128,200	Pullman.....	18,889	170,001	Oct. 18, 1924	Dec. 10
	10	Bagg. & Mail	Steel	71 ft.	132,500	Pullman.....	22,174	221,740	Oct. 18, 1924	Dec. 10
Long Island.....	60	Motor-Pass.	Steel	64 ft.	115,000	Am. C. & F.....	32,638	1,958,295	Oct. 13, 1923	Apr. 28
Maine Central.....	6	Coaches	Steel	80 ft.	.....	Osg-Bradley.....	28,450	170,700	Mar. 1, 1924	May 14
	3	Smoking	Steel	80 ft.	.....	Osg-Bradley.....	27,450	82,350	Mar. 1, 1924	May 14
	4	Bagg. & Mail	Steel	63 ft.	.....	Osg-Bradley.....	23,500	94,000	Mar. 1, 1924	May 14
Michigan Central.....	3	Dining	Steel	79 ft.	149,200	Pullman.....	49,420	148,260	Feb. 23, 1924	Sept. 27
	20	Baggage	Steel	64 ft.	113,300	Am. C. & F.....	19,555	391,099	Mar. 1, 1924	Sept. 27
Missouri Pacific.....	2	Dining	Steel	82 ft.	158,250	Am. C. & F.....	42,772	85,544	Oct. 11, 1924	Nov. 26
	2	Obs. Parlor	Steel	84 ft.	147,000	Pullman.....	43,531	87,061	Oct. 11, 1924	Nov. 26
	2	Coaches	Steel	76 ft.	13,000	Pullman.....	20,000	40,000	Aug. 2, 1924	Sept. 12
Mobile & Ohio.....	2	Express	Steel	62 ft.	111,000	Pullman.....	13,100	26,200	Aug. 2, 1924	Sept. 12
	2	Mail & Bagg.	Steel	62 ft.	113,000	Pullman.....	18,800	37,600	.....	Nov. 1
New Orleans, Tex. & Mex....	2	Dining	Steel	.....	.....	Am. C. & F.....	41,500	83,000	Oct. 11, 1924	Nov. 25
New York Central.....	35	Coaches	Steel	78 ft.	133,000	Pullman.....	27,829	974,015	Feb. 23, 1924	June 2
	25	Coaches	Steel	78 ft.	131,200	Std. Steel.....	27,820	695,500	Mar. 1, 1924	June 2
	50	Baggage	Steel	63 ft.	112,100	Am. C. & F.....	19,000	950,000	.....	June 2
	15	Coaches	Steel	78 ft.	131,400	Am. C. & F.....	27,800	416,931	Feb. 23, 1924	Sept. 27
	16	Dining	Steel	81 ft.	168,500	Pullman.....	49,430	790,880	Mar. 1, 1924	Sept. 27
	18	Pass. & Bagg.	Steel	75 ft.	127,500	Pressed Steel.....	26,467	476,404	.....	Sept. 27
	60	Exp. Refrig.	St. Unf.	52 ft.	88,000	M. D. T. Co.....	8,020	481,200	Aug. 2, 1924	Sept. 27
	28	Horse	Steel	73 ft.	142,000	Co. Shops.....	18,250	511,000	July 12, 1924	Sept. 27
Seaboard Air Line.....	4	Bagg. & Mail	Steel	71 ft.	.....	Am. C. & F.....	24,025	96,100	Dec. 8, 1926	Mar. 6
	2	Dining	Steel	81 ft.	.....	Pullman.....	43,000	86,000	Dec. 8, 1926	Mar. 6
	1	Business	Steel	83 ft.	179,000	Pullman.....	76,000	76,000	.....	Mar. 6
Southern.....	20	Coaches	Steel	76 ft.	136,500	Beth. Ship.....	26,000	520,000	Mar. 22, 1924	Mar. 31
	5	Dining	Steel	80 ft.	156,500	Pullman.....	44,500	222,500	Mar. 22, 1924	Mar. 31
	12	Bagg. & Exp.	Steel	62 ft.	111,000	Am. C. & F.....	16,290	195,480	Mar. 22, 1924	Mar. 31
	6	Mail & Bagg.	Steel	62 ft.	113,000	Am. C. & F.....	20,355	122,130	Mar. 22, 1924	Mar. 31
	2	Mail	Steel	62 ft.	113,000	Am. C. & F.....	21,360	42,720	Mar. 22, 1924	Mar. 31
	25	Coaches	Steel	76 ft.	136,500	Pullman.....	19,800	495,000	Oct. 11, 1924	Oct. 15
	10	Bagg. & Exp.	Steel	62 ft.	111,000	Pullman.....	13,100	131,000	Oct. 11, 1924	Oct. 15
	3	Dining	Steel	80 ft.	156,500	Pullman.....	41,600	249,600	Oct. 11, 1924	Oct. 15
	3	Dining	Steel	82 ft.	160,000	Pullman.....	41,600	249,600	Oct. 11, 1924	Oct. 15
Southern Pacific.....	10	Interurban	Steel	72 ft.	.....	Pullman.....	29,220	409,086	Apr. 12, 1924	May 1
	4	Coaches	Steel	72 ft.	.....	St. Steel.....	21,932	504,436	Feb. 2, 1924	May 14
	23	Baggage	Steel	70 ft.	.....	Bethlehem.....	47,898	718,170	Feb. 2, 1924	May 14
	15	Dining	Steel	77 ft.	.....	Pullman.....	29,617	148,085	Apr. 12, 1924	May 14
	5	Chair	Steel	60 ft.	.....	Std. Steel.....	24,412	73,236	Apr. 12, 1924	May 14
	3	Bagg. Postal	Steel	70 ft.	.....	Std. Steel.....	45,911	321,377	Feb. 2, 1924	May 14
	7	Buff. Bagg.	Steel	.....	.....	Am. C. & F.....	23,937	143,622	Feb. 2, 1924	May 14
	6	Bagg. Horse	Steel	.....	.....	Am. C. & F.....	20,054	1,002,722	Apr. 5, 1924	May 14
	50	Elec. Street	Steel	.....	.....	J. G. Brill.....	12,943	155,321	Apr. 5, 1924	May 14
	12	Elec. Street	Steel	.....	.....	St. Louis.....	40,769	244,611	Apr. 12, 1924	May 14
	6	Elec. Motor	Steel	58 ft.	.....	St. Louis.....	17,971	143,768	Oct. 18, 1924	Nov. 26
Texas & Pacific.....	8	Bagg. & Exp.	Steel	70 ft.	121,500	Am. C. & F.....	18,135	18,135	Oct. 18, 1924	Nov. 26
	1	Bagg. & Exp.	Steel	70 ft.	121,500	Am. C. & F.....	18,256	18,256	Oct. 18, 1924	Nov. 26
	3	Bagg. & Mail	Steel	70 ft.	124,300	Am. C. & F.....	22,580	67,741	Oct. 18, 1924	Nov. 26

DOUGLAS FIR MILL PRICES (ACTUAL RAILWAY PURCHASES), 1924

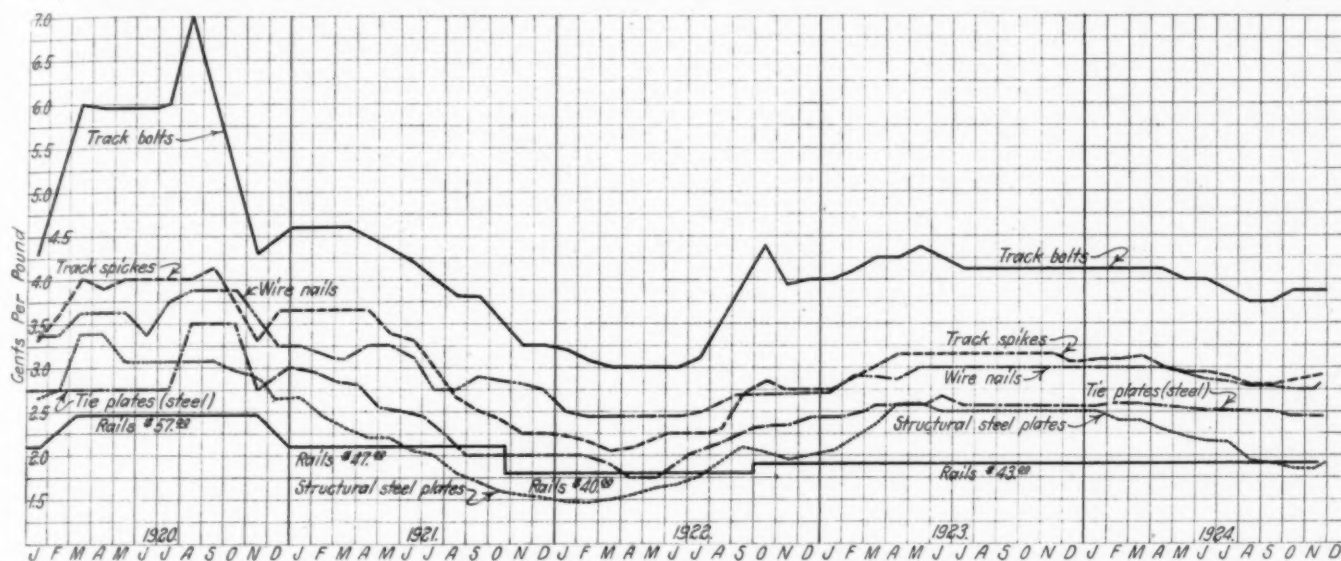
1924	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.
Stringers, 8 by 16, 32 ft., No. 1 common.....	\$28.00	\$28.00	\$28.00	\$27.00	\$24.00	\$21.00	\$21.00	\$20.00	\$20.00	\$19.00	\$19.00
Timbers, 12 by 12, 32 ft. and under, No. 1 common.....	25.00	25.00	25.00	24.00	21.00	18.00	18.00	17.00	17.00	17.00	17.00
Dimensions, 2 by 6 and 8, No. 1, common.....	19.00	20.00	20.00	19.00	19.00	18.00	18.00	18.00	17.00	17.00	17.00
Dimensions, 2 by 12, No. 1, common.....	20.00	21.00	21.00	20.00	20.00	19.00	18.50	18.50	17.50	17.50	17.50
Boards, 1 by 6, No. 1, common.....	20.00	22.50	22.50	21.50	21.00	17.50	17.00	17.50	17.00	17.00	17.00
Car framing, select common.....	30.00	30.00	30.00	29.00	26.00	23.00	23.00	19.00	18.00	19.00	19.00
Car sills, 41-45 ft.....	38.00	38.00	38.00	37.00	34.00	31.00	31.00	22.00	22.00	22.00	22.00
Car siding, No. 2, clear and better.....	50.00	50.00	50.00	45.00	40.00	35.00	33.00	37.00	33.00	35.00	35.00
Car lining, select common, D. & M.....	29.00	29.00	29.00	28.00	27.00	25.00	25.00	22.00	21.00	21.00	21.00
Car decking, finished, select common, D. & M.....	29.00	28.00	28.00	27.00	26.00	25.00	24.50	19.00	18.00	19.00	20.00
Switch ties, common.....	24.00	24.00	24.00	23.00	21.00	18.00	18.00	17.00	17.00	17.00	16.50
Crossing plank, common.....	25.00	25.00	25.00	24.00	21.00	18.00	18.00	17.00	17.00	17.00	17.00

SOUTHERN PINE MILL PRICES (ACTUAL RAILWAY PURCHASES), 1924

1924	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Stringers, 7 by 16, 28.....	\$70.00	\$70.00	\$70.00	\$70.00	\$70.00	\$70.00	\$70.00	\$70.00	\$70.00	\$70.00	\$70.00	\$70.00
Bridge material, 12 by 12, 22.....	40.00	40.00	39.00	39.00	37.00	37.00	37.00	38.00	40.00	44.00	44.00	46.00
Car sills, 36 ft. to 40 ft.....	40.00	40.00	40.00	40.00	38.00	38.00	38.00	36.00	38.00	40.00	40.00	42.00
Car lining.....	42.00	42.00	38.00	38.00	36.00	36.00	35.00	35.00	35.00	35.00	38.00	38.00
Car siding, 9 ft.....	50.00	50.00	48.00	48.00	46.00	46.00	44.00	44.00	44.00	44.00	46.00	56.00
Crossing plank, white oak, 3 by 10, 16 ft.....	27.00	27.00	27.00	27.00	25.00	25.00	25.00	27.00	27.00	27.00	27.00	27.00
1 by 8, 14 ft.....	38.00	38.00	37.00	37.00	35.00	35.00	31.00	31.00	32.00	32.00	34.00	36.00
2 by 4, 10 ft.....	30.00	30.00	28.00	28.00	27.00	27.00	26.00	26.00	28.00	28.00	30.00	30.00
2 by 10, 16 ft.....	35.00	35.00	34.00	34.00	30.00	30.00	28.00	28.00	28.00	30.00	33.00	33.00
Car decking 2 in., 10 ft.....	31.00	31.00	30.00	30.00	28.00	28.00	28.00	29.00	29.00	31.00	35.00	38.00

As during previous periods of declining demand the differential between prices at Pittsburgh and those at the other manufacturing centers under the operation of the rule of "Pittsburgh plus" largely disappeared. For this reason the announcement on September 17 of the order

decision of the leading interest in this field not to contest the order in the courts was responsible for an adjustment of prices in Chicago and other manufacturing centers outside the Pittsburgh territory. Differentials still exist but in most cases they are considerably less than those



Trend of Prices of Iron and Steel Items Applicable to Roadway and Structures

of the Federal Trade Commission requiring the mills to "cease and desist" this practice, had less influence on prices than would have been the case if the order had been promulgated during a period of more active demand when this rule would have been in full effect. However, the

represented by the freight rates from Pittsburgh to other points of manufacture.

The trends of prices in the iron and steel market of direct interest to the railroads are indicated in several of the accompanying charts.

LOCOMOTIVE PRICES IN 1924

Road	No.	Type	Weight	Cylinders	Builder	Unit Price	Total Approximate Cost	Order Reported in Railway Age	Equipment Trust Application Decided
Baltimore & Ohio	50	2-8-2	218,000	23 1/2 x 30	American	\$80,643	\$4,032,159	Oct. 22	Oct. 22
Boston & Albany	4	0-8-0	306,000	26 x 28	American	37,312	149,248	Feb. 16, 1924	June 2
Carolina, Clinchfield & Ohio	10	Mallet	534,000	25 & 39 x 32	American	64,000	320,000	Oct. 18, 1924	Sept. 27
Chesapeake & Ohio	50	2-8-2	316,000	27 x 30	American	72,066	1,441,320	Mar. 31, 1923	June 26
Clev., Cin., Chic. & St. Louis	5	2-8-2	355,000	28 x 32	American	68,547	3,427,337	May 3, 1924	July 5
Detroit & Toledo Shore Line	3	2-8-2	358,000	28 x 30	American	61,192	3,059,606	May 3, 1924	July 5
Duluth, South Shore & Atlantic	2	0-8-0	297,000	24 x 36	American	57,500	287,500	Oct. 18, 1924	Sept. 27
Florida East Coast	20	2-8-2	277,100	26 x 30	Baldwin	—	228,000	May 31, 1924	—
Georgia, Florida & Alabama	4	2-10-0	182,000	22 x 28	Baldwin	36,000	72,000	July 26, 1924	Sept. 12
Illinois Central	25	2-8-0	187,000	21 x 28	American	38,000	76,000	July 26, 1924	Sept. 12
Indiana Harbor Belt	5	4-6-2	202,000	21 x 26	American	63,630	1,272,600	Apr. 5, 1924	July 10
Long Island	4	4-8-2	308,000	26 x 28	American	44,540	222,700	Apr. 5, 1924	July 10
Louisiana & Arkansas	2	0-8-0	215,000	25 x 28	American	35,000	150,000	(2) Jan. 12, 1924	May 8
Maine Central	2	4-8-2	362,500	28 x 28	Lima	67,655	1,691,375	Sept. 13, 1924	Dec. 10
Michigan Central	5	0-8-0	223,500	25 x 28	Lima	42,950	214,750	Feb. 16, 1924	May 16
Missouri Pacific	11	2-8-2	305,500	25 x 32	Lima	61,100	305,500	Mar. 1, 1924	May 16
Mobile & Ohio	4	4-6-0	237,000	24 x 28	Penn. R. R.	48,000	192,000	—	Apr. 28
New York Central	32	0-8-0	208,700	23 x 28	American	41,700	208,500	Oct. 13, 1923	Apr. 28
New York, Chicago & St. Louis	10	2-8-2	259,000	24 x 28	Baldwin	50,000	100,000	Nov. 15, 1924	Dec. 10
Southern	20	4-6-2	272,000	25 x 28	American	62,500	125,000	Mar. 1, 1924	May 14
Tennessee, Alabama & Georgia	1	2-8-2	298,000	26 1/2 x 30	American	67,500	405,000	Mar. 1, 1924	May 14
Union Pacific	10	4-6-2	313,000	24 x 28	American	64,000	320,000	Oct. 18, 1924	Sept. 27
Western Pacific	5	2-8-2	333,000	27 x 32	American	64,961	844,499	Sept. 13, 1924	Nov. 26
	11	2-8-2	333,000	27 x 32	American	56,711	623,818	Sept. 13, 1924	Nov. 26
	6	4-6-2	314,000	23 x 28 & 32 (3)	American	62,111	62,111	Sept. 13, 1924	Nov. 26
	3	4-6-2	290,000	27 x 28	American	56,283	337,696	Sept. 13, 1924	Nov. 26
	1	4-6-2	290,000	27 x 28	American	55,963	167,888	Sept. 13, 1924	Nov. 26
	15	4-6-2	302,500	22 1/2 x 28 (3)	American	61,363	61,363	Sept. 13, 1924	Nov. 26
	4	0-8-0	214,000	25 x 28	Baldwin	41,773	626,599	Sept. 13, 1924	Nov. 26
	1	2-8-2	290,000	26 x 30	Baldwin	45,300	181,200	Oct. 25, 1924	Nov. 1
	32	4-6-2	274,600	25 x 28	Baldwin	46,000	46,000	Oct. 25, 1924	Nov. 1
	25	2-8-2	337,000	28 x 30	American	80,197	2,566,304	Mar. 1, 1924	June 2
	18	0-8-0	219,000	25 x 28	American	36,908	922,700	Feb. 16, 1924	June 2
	20	2-8-2	337,000	28 x 30	American	80,190	1,443,420	Mar. 1, 1924	Sept. 27
	5	0-8-0	219,000	25 x 28	American	34,850	871,250	July 19, 1924	Sept. 27
	10	0-8-0	216,500	25 x 28	Lima	45,000	450,000	Mar. 15, 1923	Feb. 19
	10	2-8-2	317,500	26 x 30	Lima	65,000	650,000	Mar. 15, 1923	Feb. 19
	12	Electric	—	—	—	132,475	1,589,000	—	May 14
	20	0-8-0	214,000	25 x 28	American	33,400	668,000	Mar. 22, 1924	Mar. 31
	5	2-8-8-2	450,000	25 & 39 x 30	Baldwin	79,950	399,750	Mar. 22, 1924	Mar. 31
	25	2-8-2	326,000	27 x 32	American	51,900	1,297,000	Oct. 11, 1924	Oct. 15
	15	4-6-2	299,000	27 x 28	American	51,900	778,500	Oct. 11, 1924	Oct. 15
	10	0-8-0	214,000	25 x 28	American	34,550	345,500	Oct. 11, 1924	Oct. 15
	17	2-10-2	397,900	29 1/2 x 32	Baldwin	83,625	1,421,630	Oct. 27, 1923	May 14
	8	4-6-2	305,330	25 x 30	Baldwin	71,425	571,402	Oct. 27, 1923	May 14
	18	4-8-2	351,000	28 x 30	American	78,444	1,411,995	Oct. 27, 1923	May 14
	20	0-6-0	—	—	Lima	37,155	743,104	Nov. 3, 1923	May 14
	5	Electric	—	—	—	46,000	230,000	Apr. 21, 1923	May 14
	1	2-8-0	147,000	20 x 26	Baldwin	29,000	29,000	Mar. 15, 1924	—
	20	2-8-8-0	495,500	26 & 41 x 32	American	87,653	1,753,050	Mar. 8, 1924	Mar. 29
	10	2-10-2	367,000	29 1/2 x 30	Baldwin	70,566	705,663	Mar. 8, 1924	Mar. 29
	5	4-8-2	340,000	29 x 38	American	68,324	341,619	Mar. 8, 1924	Mar. 29
	5	2-6-6-2	429,500	23 1/2 & 37 x 32	American	79,750	398,750	Jan. 19, 1924	Apr. 25
	5	2-8-2	327,000	28 x 30	American	65,000	325,000	Jan. 19, 1924	Apr. 25

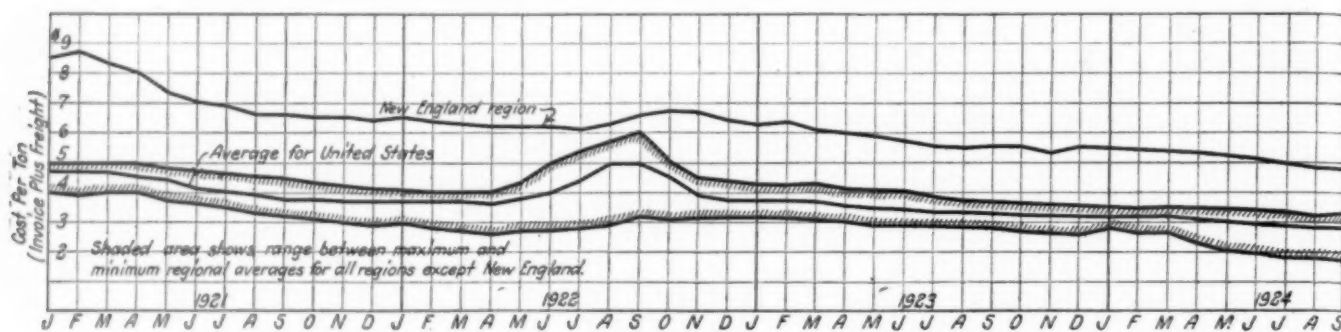
Lumber Prices Lower

The decline in business and the reduction in prices was more marked in the field of lumber than in that of iron and steel. However, conditions varied widely in different producing territories. A severe winter of protracted duration curtailed building construction but with the advent of warm weather a general demand for yard

that prevailed in the summer of 1922. The range of lumber prices on items applicable to railway structures and equipment is shown in tables and diagrams.

Little Activity in the Tie Market

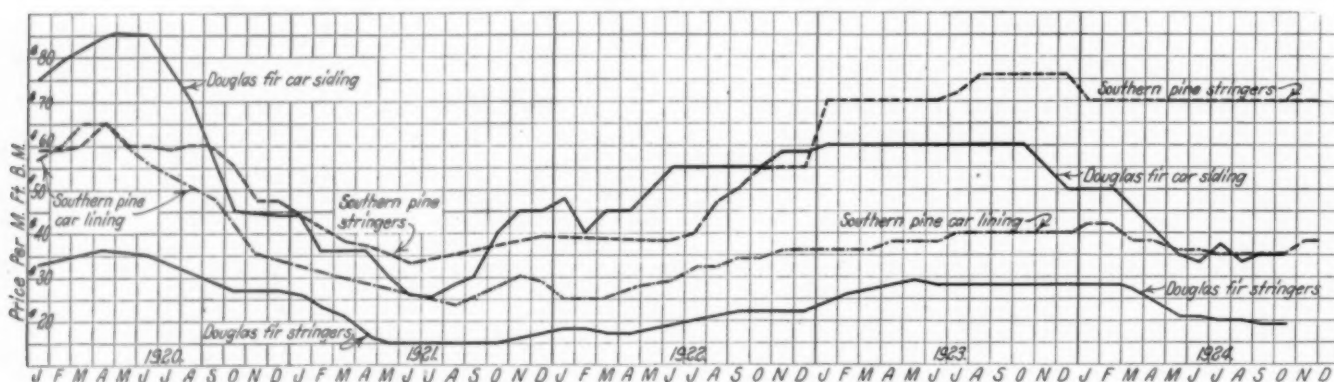
The story of the cross tie market for the last 12 months is but a repetition of earlier experiences. The previous



Price of Coal Purchased by Class 1 Railroads as Reported by the I. C. C. Bureau of Statistics

lumber in the middle west and east served to stimulate business for the Southern pine manufacturers whose operations are conducted on a thoroughgoing basis throughout

year had witnessed a characteristic inflation. Large appropriations for maintenance expenditures, due to increased earnings following a period of limited tie

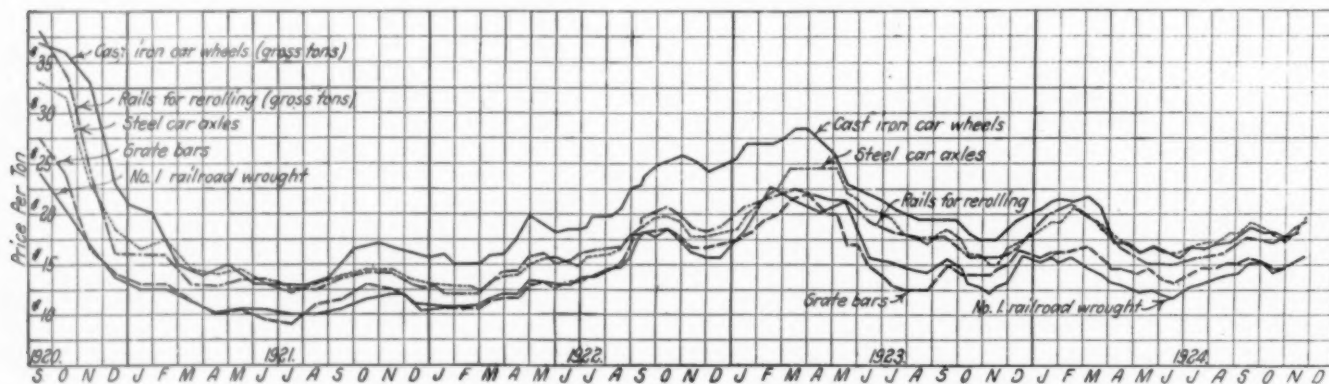


Price Range of Typical Lumber Items During the Past Five Years

the year. Prices were lower than during the previous year but the differences were not marked.

The purchase of lumber by the railroads was on a rather restricted basis throughout a considerable portion of the year in most parts of the country but was most

purchases, prompted the railroads to place large orders for ties at a time when production was small. The demand quickly exceeded the supply, prices advanced and the pressure for delivery resulted in loose inspection and many ties did not measure up to the grades at which they were



How Scrap Prices Have Varied Since the Deflation of 1920

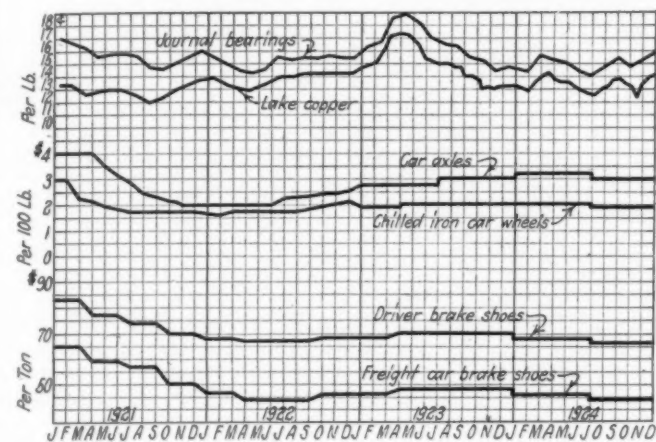
severely felt on the north Pacific coast, where it occurred concurrently with the falling off in building operations on the Pacific coast. This was reflected in the decline in prices of Douglas fir lumber to levels approximating those

accepted. Before the close of the year production caught up with demand, shipments increased in volume and the railroads, having replenished their stocks, stopped buying as suddenly as they began. The stocks thus accumulated

were entirely ample for the anticipated requirements for 1923, which had been based on the assumption that renewals for 1924 would be on a par with those of the previous year. However, a falling off of earnings in the spring of 1924 led to a curtailment of maintenance expenditures with the result that ties were not renewed in as large quantities as had been planned. This meant that some roads had a considerable surplus of ties which could be applied to the 1925 requirements.

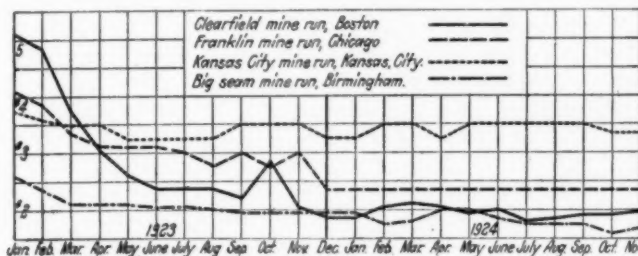
The net result of this condition was a very general cessation of tie purchases throughout the greater part of 1924. Some roads, particularly those in tie producing territories, have gradually accumulated their 1925 require-

While no authentic statistics are available, it appears that stocks of cross-ties in the yards of the railroads and contractors are not as small as has been the case previously following a year of curtailed buying, although it is possible that the major portion of the ties now in the hands of the producers represents stocks for the protection of orders already in hand. One influence that has had a growing effect on the volume of stocks is the increased



Prices of Typical Equipment Items for the Past Four Years

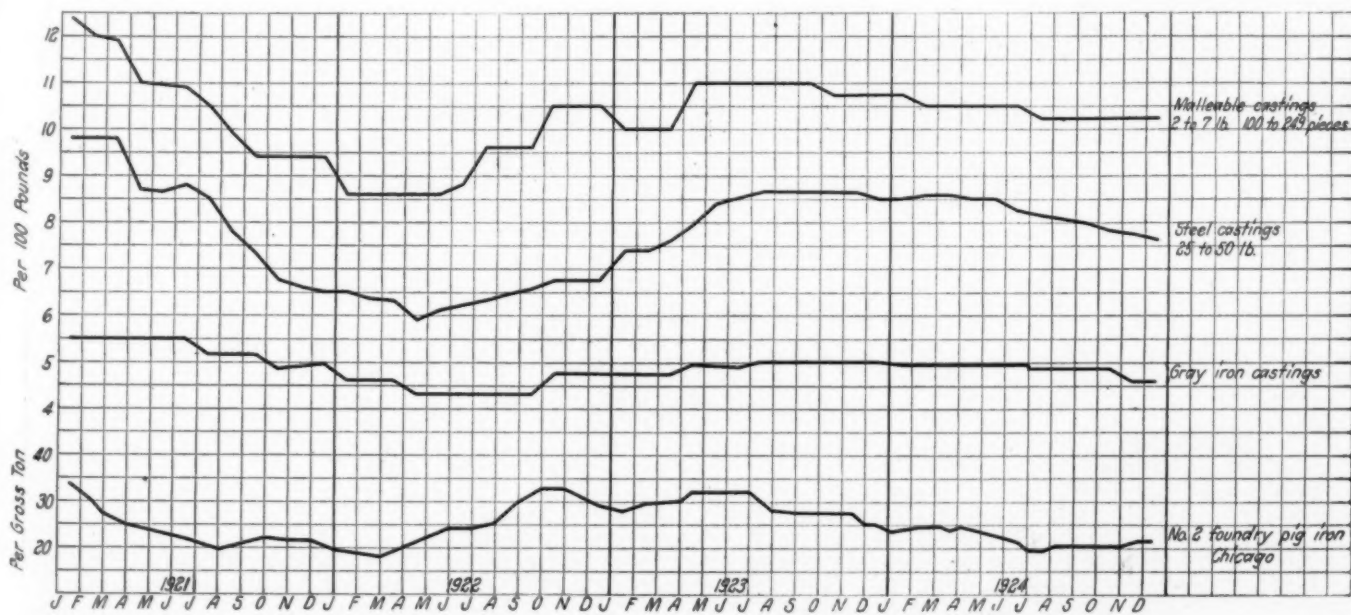
ments but the total volume of purchases has been far below normal, in spite of the fact that prices fell from 10 to 25 cents at the beginning of the year and suffered further reduction during the summer months. Under these circumstances, it is obvious that production would reach low levels. This has been particularly the case in



Spot Coal Prices for a Two-Year Period

use of treated ties. Proper results in treatment call for several months of seasoning, which means that considerable quantities of ties must be kept in storage at all times to protect the output of the plants. With a consistent adherence to treatment and seasoning practices this would not effect any increase in the number of ties actually available for insertion in the track, but in practical application it means that any temporary shortage in the tie supply is often overcome in part by the withdrawal of these ties from the yards in advance of full seasoning, notwithstanding the obvious objection to this practice. Another point to bear in mind is that the past eight years have seen a great impetus in the treatment of ties and that a considerable number of railroads whose tie renewals have hitherto been defined by the life of untreated timber are now beginning to derive the benefits of timber preservation.

These facts, however, afford little assurance that the



Range of Prices of Materials Used by the Railroad Mechanical Departments

Tennessee and Mississippi. Conditions are somewhat better in Texas and Arkansas and even more favorable in the Ohio valley. Better production is also being obtained in cedar ties, but the output of oak ties is low with the exception of certain areas in Oklahoma and Missouri.

producers will not soon have the upper hand in the tie market. Even the moderate increase in buying which has become manifest in recent weeks has already served to bring out some advances in prices. That the cost of cross-ties purchased in the early part of 1925 will be higher

than that represented by the average range of prices during 1924 appears certain. Absence of accurate figures on the relation of stocks on hand to requirements makes it impossible to hazard any more specific forecast.

Creosote oil reduced in price during the course of the year from 19 cents to approximately 12 cents early in November, but recent quotations of $13\frac{1}{2}$ cents indicate an upward trend.

Car and Locomotive Material

The prices of typical materials used in car and locomotive construction and maintenance were generally lower in 1924 than in 1923, following the downward trend of basic materials, as shown in two of the charts. It will be noted that the price of journal bearings closely parallels that of lake copper, which is more subject to stock market fluctuations than most materials purchased by the railroads. The influence of the presidential election, for example, is plainly shown by the increase in price of both lake copper and journal bearings in November, 1924.

The price of chilled iron car wheels has been practically constant for the past two years but there was a slight increase in car axle prices during the first half of 1924 which was offset by a decrease in the last half. Brake shoes for both locomotive driving wheels and freight car wheels showed a slight decrease throughout the year. The prices of castings used by the mechanical department, including gray iron, steel and malleable castings followed closely the trend of prices of No. 2 foundry pig iron, which also declined throughout the year.

Railway Coal Prices

In general the prices of both contract and spot railway coal have been at a relatively uniform level throughout the year, slightly below last year's prices. Referring to the chart of railway coal prices, a fairly continuous although slow drop in prices is observed from the peak in Septem-

ber, 1922, to the present time, New England prices being approximately \$2 a ton above the average price for other regions. The shaded area on the chart shows the range between maximum and minimum regional averages for all regions except New England. The maximum price outside of New England is usually quoted in the Great Lakes or Northwestern region and the minimum in the Pocahontas region. In spite of the high cost of mining, the total coal production has been large and the coal now in storage is variously estimated at about 50 million tons. The competition between operators, weather conditions and other causes have operated to keep prices down.

Equipment Prices

There are shown the usual tables of locomotive, freight car and passenger car prices. The tabulations include only such equipment as has been financed through issues of equipment trusts which have been approved during the current year by the Interstate Commerce Commission. The data are given in considerable detail and include the name of the road, an indication of the type and size of the equipment, the number of units, the price per unit, the name of the builder, the date of the order, and the date on which approval of the equipment trust financing was announced. The material, as to purchaser, number of units of each type, and the price, is obtained from the finance dockets and the other items are supplied by the *Railway Age* from its own equipment compilations.

The purpose of the tabulations is to indicate the general trend of equipment prices. The equipment is classified under the heads—locomotives, freight cars and passenger cars—with the result that the items covered in a particular equipment trust issue which may cover equipment of all three classes, do not appear together. However, any one desirous of checking up on a particular issue should be easily able to assemble the data for such purpose from the tables.



Express Train Leaving West Station, Vienna

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Receiverships and Foreclosure Sales

*Mileage operated by receivers on December 31 totaled
10,487; at end of 1923, 12,949*

ON December 31, 1924, there were in the hands of receivers but 53 railway properties, operating a total of only 10,487 miles of line. The number of roads was 10 less than at the end of 1923, and was the smallest number of roads in the hands of receivers since the end of 1912.

The mileage of roads in the hands of receivers at the end of the year was some 2,500 less than at the end of 1923. It was the lowest figure reported since 1912, and was but one-third the total mileage in the hands of receivers on December 31, 1916, when railway adversity, as reflected in figures of this kind, was at the worst point

TABLE I—RAILROADS IN THE HANDS OF RECEIVERS

Road	Mileage operated	Mileage owned	Date of receivership	Funded debt out-standing	Capital stock outstanding	Total Old Company securities	Remarks
Alabama, Florida & Gulf.....	32	32	June 4, 1924	None	\$50,000	\$50,000	
Alabama Northern	7	7	Mar. 4, 1924	None	35,000	35,000	
Atlanta, Birmingham & Atlantic.....	640	637	Feb. 25, 1921	\$10,135,907	30,000,000	40,135,907	
Atlantic & Yadkin.....	163	163	Mar. 24, 1924	1,500,000	1,000,000	2,500,000	Formerly Cape Fear & Yadkin Valley
Birmingham & Southeastern.....	48	51	July 26, 1920	680,000	728,000	1,408,000	
Birmingham, Columbus & St. Andrews....	38	19	Dec. 24, 1908	250,000	None	250,000	
Cape Girardeau Northern.....	12	104	Apr. 14, 1914	1,156,000	110,000	1,266,000	Steam service on 12 miles only. To be sold shortly
Caro Northern	17	17	Sept. 1, 1921	None	100,000	100,000	
Chicago & Alton.....	1,052	686	Aug. 31, 1922	92,027,065	39,955,500	131,982,565	
Chicago, Palatine & Wauconda.....	16	16		100,000	60,000	160,000	
Dansville & Mount Morris.....	15	15	June 8, 1894	150,000	50,000	200,000	
Delaware & Northern.....	40	40	Mar. 16, 1921	None	1,250,000	1,250,000	
Denison, Bingham & New Orleans.....	24	24	Apr. 1, 1923	350,000	25,000	375,000	
Denver & Rio Grande Western.....	2,610	2,490	July 22, 1922	129,726,000	57,998,582	187,724,582	Reorganization plan effective
Denver & Salt Lake.....	255	252	Aug. 16, 1917	11,802,149	583,515	12,385,664	
Detroit, Bay City & Western.....	105	97	Sept. 28, 1922	729,000	450,000	1,179,000	Was to have been sold Dec. 17. Sale postponed to January 17, 1925
Eastern Kentucky	36	36	Mar. 31, 1919	None	3,455,900	3,455,900	
Ensley Southern	24	....	July 1, 1924	....	....	....	Subsidiary of Southern Ry.
Ettrick & Northern.....	10	10	June 28, 1922	49,300	144,000	193,300	
Gainesville & Northwestern.....	37	35	Dec. 8, 1923	75,000	750,000	825,000	
Gainesville Midland	74	72	Feb. 15, 1921	973,011	550,000	1,523,011	
Georgia & Florida.....	445	442	Mar. 27, 1915	10,632,000	8,695,000	19,327,000	Extension to Greenwood, S. C., and reorganization under consideration
Gulf, Texas & Western.....	130	99	Jan. 24, 1921	2,000,000	500,000	2,500,000	
Kalamazoo, Lake Shore & Chicago.....	17	17	Aug. 8, 1923	390,000	37,400	427,400	Will be dismantled
Kansas & Oklahoma.....	19	19	Apr. 17, 1923	None	288,900	288,900	
Kansas City, Kaw Valley & Western.....	41	35	July 19, 1924	1,374,500	740,500	2,115,000	
Kansas City, Mexico & Orient R. R.....	259	272	Apr. 17, 1917	31,000,000	20,000,000	51,000,000	Sold March 27, 1924. Operations suspended. K. C. terminals acq. by Mo. Pac.
Kansas City Northwestern.....	....	171	Feb. 27, 1917	....	....	....
Kansas, Oklahoma & Gulf.....	314	312	June 7, 1924	10,185,757	8,776,163	18,955,920	
Loranger, Louisiana & North-Eastern.....	10	8	Jan. 9, 1922	100,000	25,000	125,000	
Manistee & North-Eastern.....	208	182	Dec. 24, 1918	1,172,000	2,000,000	3,172,000	
Midland & Northwestern.....	....	65	Mar. 1, 1920	213,666	10,035	223,701	Op. sus. Purchased by Tex. & Pac. to protect judgment on notes
Minneapolis & St. Louis.....	1,650	1,536	July 26, 1923	46,833,614	25,792,600	72,626,214	
Muscle Shcals, Birm. & Pensacola.....	185	185	Mar. 5, 1924	601,500	2,500,000	3,101,500	
Paris & Mt. Pleasant.....	51	51	Feb. 26, 1920	682,500	75,000	757,000	
Peoria Ry. Terminal.....	11	11	Aug. 3, 1922	2,444,000	1,000,000	3,444,000	
Pine Bluff & Northern.....	8	8	Feb. 9, 1916	None	160,000	160,000	
Pittsburgh, Shawmut & Northern.....	210	190	Aug. 1, 1905	16,825,600	15,000,000	31,825,600	
St. Louis, El Reno & Western.....	42	42	Oct. 9, 1915	817,000	970,800	1,787,800	
San Antonio, Uvalde & Gulf.....	317	315	Aug. 14, 1914	5,087,421	315,000	5,402,421	
Sandy River & Rangeley Lakes.....	104	104	July 8, 1923	837,000	340,000	1,177,000	
San Luis Southern.....	32	32	Feb. 29, 1924	327,000	1,000,000	1,327,000	
Savannah & Atlanta.....	145	145	Mar. 4, 1921	3,375,000	2,250,000	5,625,000	
Sharpville Railroad	21	21	Jan. 21, 1897	None	350,000	350,000	
Tallulah Falls Railway.....	57	57	June 24, 1923	1,519,000	323,400	1,842,400	
Timpson & Henderson.....	34	34	Mar. 6, 1920	None	250,000	250,000	
Toledo, Peoria & Western.....	248	231	July 2, 1917	4,895,000	4,076,900	8,971,900	
Trinity & Brazos Valley.....	369	303	June 16, 1914	9,357,014	304,000	9,661,014	
Wabash, Chester & Western.....	65	65	Jan. 4, 1924	728,952	1,250,000	1,978,952	
Wellington & Powellville.....	24	24	Sept. 28, 1923	86,667	90,000	176,667	
Wichita Falls, Ranger & Fort Worth.....	75	75	Dec. 26, 1921	None	120,000	120,000	
Wichita Northwestern	100	100	Nov. 10, 1922	381,750	1,690,000	2,071,750	
Wyoming, North & South.....	41	41	Aug. 1, 1924	None	None	None	Now operated as North & South Railway
	10,487	9,996					

TABLE II—FORECLOSURE SALES IN 1924

Name of road	Mileage	Funded debt outstanding	Capital stock outstanding	Remarks
Atlantic, Waycross & Northern.....	12		\$30,000	Bought by St. Mary's R. R. Co.
Chicago, Peoria & St. Louis.....	247	\$3,833,000	4,000,000	Sold in parcels on Nov. 20.
Cleveland, Southeastern & Columbus....	212	4,455,000	6,648,000	Sold March 14.
Colorado, Wyoming & Eastern.....	111	2,390,000	4,110,500	Reorganized as Laramie, North Peak & Western R. R.
Cumberland Railroad	13	1,028,000	20,999	Acquired by Artemus-Jellico R. R.
Denver & Rio Grande Western.....	2,604	120,226,000	57,988,582	Sold Oct. 29.
Kansas City, Mexico & Orient R. R.....	259	31,000,000	20,000,000	Sold March 27, 1924; in hands of receiver.
Keokuk & Des Moines.....	162	2,750,000	4,125,000	Sold Aug. 18, 1924; leased by C. R. I. & P. Ry.
Midland & Northwestern.....	65	213,666	10,035	Op. sus. Purchased by Tex. & Pac. to protect judgment on notes.
Midland Railway	88	360,000	500,000	Portion (Statesboro Northern, 40 miles) acquired by Ga. & Fla. Re-remainder junked.
Ocilla Southern	69	416,000	265,000	Sold Jan. 1, 1924, and junked.
Randolph & Cumberland.....	23	138,000	1,000,000	Acquired by Moore Central, Oct. 21.
Salina Northern	81	1,500,000	1,143,300	Sold Feb. 7, 1924; Salina & Santa Fe organized Feb. 23, 1924; leased to A. T. & S. Fe.
West Virginia Midland.....	46	600,000	500,000	
14 companies	3,992	\$168,909,666	\$100,341,416	

it had reached since the hardships of the nineties. During the year 1924, 11 companies went into the hands of receivers. No important railroad was included

and the total miles of line operated by all was less than 1,000.

There are now shown in the list of roads in the hands of receivers but four properties having a mileage of 500 or more. These are the Atlanta, Birmingham & Atlantic, the Chicago & Alton, the Denver & Rio Grande Western, and the Minneapolis & St. Louis. As concerns the large roads, the only important change during the year—there having been no additions—has been the elimination from

TABLE III—SUMMARY OF FORECLOSURE SALES, 1876 TO 1923

Year	Number of roads	Miles	Bonds and stocks
1876	30	3,840	\$217,848,000
1877	54	3,875	198,984,000
1878	48	3,906	311,631,000
1879	65	4,909	243,288,000
1880	31	3,775	263,882,000
1881	29	2,617	137,923,000
1882	16	867	65,426,000
1883	18	1,354	47,100,000
1884	15	710	23,504,000
1885	22	3,156	278,394,000
1886	45	7,687	374,109,000
1887	31	5,478	328,181,000
1888	19	1,596	64,555,000
1889	25	2,930	137,815,000
1890	29	3,825	182,495,000
1891	21	3,223	169,069,000
1892	28	1,922	95,898,000
1893	25	1,613	79,924,000
1894	42	5,643	318,999,000
1895	52	12,831	761,791,000
1896	58	13,730	1,150,377,000
1897	42	6,675	517,680,000
1898	47	6,054	252,910,000
1899	32	4,294	267,534,000
1900	24	3,477	190,374,000
1901	17	1,139	85,808,000
1902	20	693	39,788,000
1903	13	555	15,885,000
1904	13	524	28,266,000
1905	6	679	20,307,000
1906	8	262	10,400,000
1907	6	114	13,777,000
1908	3	138	2,547,000
1909	12	2,629	250,033,000
1910	17	1,100	95,660,109
1911	13	1,386	40,741,543
1912	12	661	25,910,990
1913	6	1,159	86,163,850
1914	9	1,470	83,189,500
1915	11	3,914	285,258,782
1916	26	8,355	703,444,855
1917	20	10,963	557,846,348
1918	11	763	24,735,187
1919	8	459	15,479,587
1920	7	380	7,676,200
1921	11	4,173	306,123,942
1922	15	6,151	299,491,646
1923	8	637	14,622,900
1924	14	3,992	269,251,082

TABLE IV—ROADS GOING INTO RECEIVERSHIP, 1876 TO 1923

Year	Number of roads	Miles	Bonds and stocks
1876	42	6,662	\$467,000,000
1877	38	3,637	220,294,000
1878	27	2,320	92,385,000
1879	12	1,102	39,367,000
1880	13	885	140,265,000
1881	5	110	3,742,000
1882	12	912	39,074,000
1883	11	1,990	108,470,000
1884	37	11,038	714,755,000
1885	44	8,836	385,460,000
1886	13	1,799	70,346,000
1887	9	1,046	90,318,000
1888	22	3,270	186,814,000
1889	22	3,803	99,664,000
1890	26	2,963	105,007,000
1891	26	2,159	84,479,000
1892	36	10,508	357,692,000
1893	74	29,340	1,781,046,000
1894	38	7,025	395,791,000
1895	31	4,089	369,075,000
1896	34	5,441	275,597,000
1897	18	1,537	92,909,000
1898	18	2,069	138,701,000
1899	10	1,019	52,285,000
1900	16	1,165	78,234,000
1901	4	73	1,627,000
1902	5	278	5,835,000
1903	9	229	18,823,000
1904	8	744	36,069,000
1905	10	3,593	176,321,000
1906	6	204	55,042,000
1907	7	317	13,585,000
1908	24	8,009	596,359,000
1909	5	859	78,095,000
1910	7	735	51,427,500
1911	5	2,606	210,606,882
1912	13	3,784	182,112,497
1913	17	9,020	477,780,820
1914	22	4,222	199,571,446
1915	12	20,143	1,070,808,628
1916	9	4,439	208,159,689
1917	19	2,486	61,169,962
1918	8	3,519	242,090,800
1919	7	244	11,886,779
1920	10	541	21,620,150
1921	14	1,744	63,872,113
1922	12	4,330	329,114,860
1923	10	2,218	87,913,581
1924	11	920	30,223,372

TABLE V—RAILROAD MILEAGE IN THE HANDS OF RECEIVERS
(Figures to 1922, Inclusive, from I. C. C. Statistics for Year Ended December 31, 1922)

Years ended	Miles of road operated by receivers at close of year	Net change during the years in miles of road operated	Number of roads in charge of receivers at close of year
June 30, 1894	40,819	.....	192
1895	37,856	-2,963	169
1896	30,476	-7,380	151
1897	18,862	-11,614	128
1898	12,745	-6,117	94
1899	9,853	-2,892	71
1900	4,178	-5,675	52
1901	2,497	-1,681	45
1902	1,475	-1,022	27
1903	1,185	-290	27
1904	1,323	+138	28
1905	796	-527	26
1906	3,971	+3,175	34
1907	9,529	+5,558	29
1908	10,536	+1,007	52
1909	5,257	-5,279	44
1910	4,593	-664	39
1911	9,786	+5,193	44
1912	16,286	+6,500	49
1913	18,608	+2,322	68
1914	30,223	+11,615	85
1915	37,535	+7,310	94
Dec. 31, 1916	34,804	-2,730	80
1917	17,376	-17,428	82
1918	19,208	+1,832	74
1919	16,590	-2,618	65
1920	16,290	-300	61
1921	13,512	-2,778	68
1922	15,259	+1,747	64
1923	12,949	-2,310	64
1924	10,487	-2,462	53

*Represents decrease for six months.

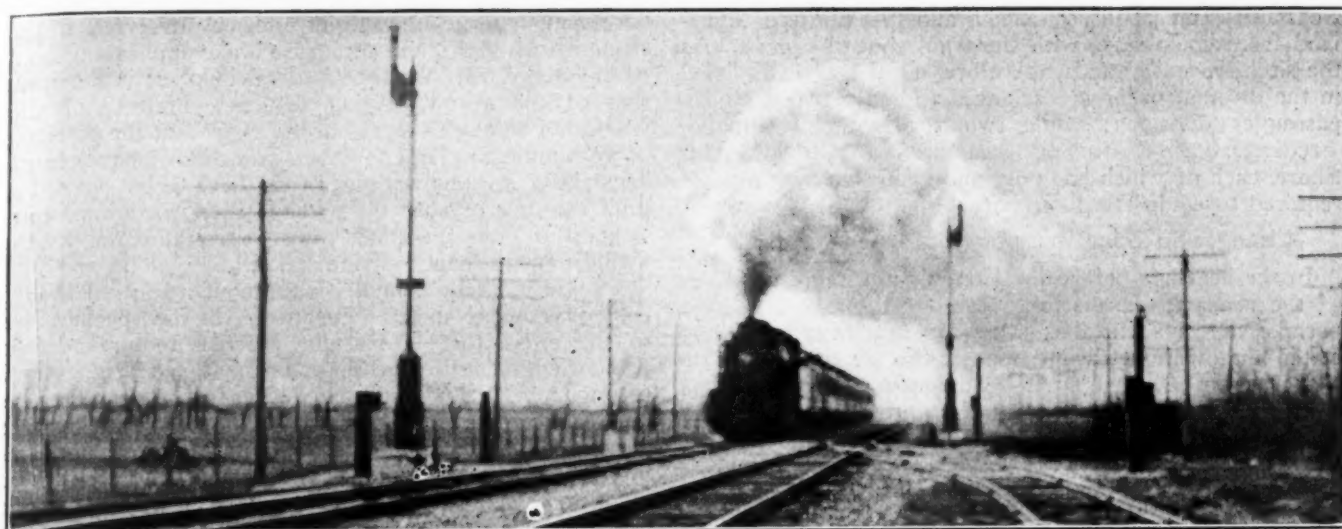
the lists of the Texas & Pacific, reorganized without foreclosure sale and returned to the company in May. The foreclosure sale of the Denver & Rio Grande Western took place on October 29, and the reorganization plan, whereby the property will be owned jointly by the Missouri Pacific and the Western Pacific, has been approved. At the moment the receiver has not yet been discharged

TABLE VI—RECEIVERSHIPS ESTABLISHED IN 1924

Name of road	Mileage	Funded debt outstanding	Capital stock outstanding
Alabama, Florida & Gulf	32	.....	\$50,000
Alabama Northern	7	.....	35,000
Atlantic & Yadkin	163	\$1,500,000	1,000,000
Chicago, Palatine & Wauconda	16	100,000	60,000
Ensley Southern	24	.....	.....
Kansas City, Kaw Valley & Western	41	1,374,500	740,500
Kansas, Oklahoma & Gulf	314	10,185,757	8,770,163
Muscle Shoals, Birmingham & Pensacola	185	601,500	2,500,000
San Luis Southern	32	327,000	1,000,000
Wabash, Chester & Western	65	728,952	1,250,000
Wyoming North & South	41	.....	.....
11 companies	920	\$14,817,709	\$15,405,663

so the road has to be included in the list of properties in the hands of receivers.

During the year there were foreclosure sales of 14 roads, the only large road included being the Denver & Rio Grande Western. Others included the Chicago, Peoria & St. Louis, sold on November 20 in parcels, and the Kansas City, Mexico & Orient, sold in March to interests associated with the present company but not yet reorganized. The Texas & Pacific was reorganized without foreclosure and does not, therefore, appear in the table of foreclosure sales. Several small properties disappear from the list of roads in the hands of receivers this year because of their having gone out of business.



Train Control Ensures Observance of Signal Indications

Automatic Train Control Progress

Intensive development, changes in specifications, suspension of part of second order, and interim inspections were features of year

By John H. Dunn

THE year 1924 has seen great strides in the development and installation of automatic train control.

The insertion of the provision for the permissive feature of the train stop in the specifications and several new interpretations of the requirements of the Commission's order have necessitated intensive development on the part of the manufacturers. Of the 47 roads on which the first order is now effective in requiring a complete engine division to be equipped by January 1, 1925, all but four have announced their selection of a system or device.

The two complete division installations previously in service, i.e., the Chicago & Eastern Illinois, and the Chicago, Rock Island & Pacific have been continued in service during the year without extension of road-side equipment. Three other roads have practically completed their wayside signal and control installations on a complete division, but equipment for the full quota of locomotives has been delayed. At least 22 additional roads have installed control apparatus on sections of 20 miles or more on the specified territory and have equipped a corresponding number of locomotives. Five interim inspections of these installations have already been made by representatives of

the Commission and several other roads are now ready for such inspections.

Evidently the Interstate Commerce Commission was not satisfied with the progress being made by the 49 roads

which it had ordered to equip one division by January 1, 1925, in accordance with the order of July 13, 1922. Therefore, on January 14, 1924, a second order was issued, requiring 47 of the roads listed in the previous order to install train control on a second division and also ordering 45 additional roads to equip one division prior to February 1, 1926. On March 3, the carriers filed a joint petition requesting that the second order be vacated, and that an extension of time be granted for compliance with the first order. The new roads included in the second order were granted a hearing before the Commission on May 7-15, as a result of which the Commission, under date of July 18, suspended the

Of the 47 roads on which the first train control order is now effective, two installations are completed and four others are from 75 to 90 per cent finished. At least 22 roads have sections of 20 miles ready for service. They have also installed signal equipment and erected pole lines, so that a large portion of the wayside work over entire divisions is finished. The majority of the 47 division installations of train control can therefore be completed in a few months provided the results of the interim inspections are satisfactory. Only four roads have not announced contracts, but these have made extensive tests.

second order in so far as the 45 new roads were concerned and also inserted a provision for the permissive feature of the train stop in the specifications of the order. However, no extension of the time for compliance with the first order was granted.

Later in the year the Commission released the Chicago,

St. Paul, Minneapolis & Omaha and the Western Maryland from compliance with the train control orders. As the situation now stands, therefore, 45 of the roads listed in the original order are required to equip two complete passenger divisions; while two roads, the Richmond, Fredericksburg & Potomac and the West Jersey & Sea Shore, each of which has only one main line division, are required to equip those divisions.

Changes in Specifications and Interpretations

In the hearings before the Commission, representatives of the roads made a strong plea for the insertion of a permissive clause in the train stop specification. They stated that without the permissive feature the train stop device, without speed control, would not meet their needs because of the impracticability of bringing all trains to an absolute stop at certain locations on grades, and because

developing an acknowledging device involving a time element such that if the automatic brake application should be initiated during the time interval involved in the operation of the acknowledging device a brake application would not be effective. In order to prevent the possibility of an engineman holding down an acknowledging button constantly, various arrangements have been devised to limit the time or space of possible acknowledgment to an interval of 7 to 20 seconds prior to arrival at the point of application or change of indication.

On July 22, the Commission announced an addition to sub-paragraph *b* under "Functions" in the specifications, to the effect that "consistent practice requires definite acknowledgment by the engineman at each signal indicating stop." Some railroad officers state that they see no necessity for the recurrent acknowledgment feature, although in the report of the Commission regarding the interim inspection on the Pennsylvania a criticism was made to the effect that, "no provision had been made in this installation for reacknowledgment at successive stop signals."

Three Older Installations Continued in Service

The Chicago, Rock Island & Pacific installation of the intermittent ramp type of the Regan Safety Devices Company on 165 miles of double track between Blue Island, Ill., and Rock Island, was inspected by the Commission on November 30, 1923, and a decision was rendered on December 17, 1923.

The Chicago & Eastern Illinois has had an installation of the Miller Train Control Corporation's intermittent ramp system in service for 10 years on 105.4 miles of double track from Yard Center, Ill., to Danville. The equipment of the 108 locomotives assigned to this division now conforms to the requirements of the Commission's order and 30 engines of the Elgin, Joliet & Eastern, which operate over a portion of the train control territory, have been equipped. The C. & E. I. has recently requested a final inspection and approval of this division installation in compliance with the first order.

The Chesapeake & Ohio has had train control in service on 21 miles of single track between Gordonsville, Va., and Charlottesville, since June, 1919. A 40-mile single track section from Charlottesville to Staunton with eight passenger and nine freight locomotives was also placed in service on January 16, 1924. The intermittent ramp system of the American Train Control Corporation is used, a total of 26 locomotives being equipped. This installation constitutes about 75 per cent of the division installation required under the first order.

Interim Inspection Affords Relief to Carriers

The carriers greeted with enthusiasm the announcement of the Commission in April to the effect that if a road would equip a 20-mile section of its division and a suitable number of locomotives of each class with control apparatus the Commission would co-operate in an inspection of this portion of an installation for the purpose of giving opinions or advice to the carrier as to the desirability or objections of the principle or construction of the system. This offered a promise of an opinion on the essential features of a device or installation with an expenditure of only approximately one-fourth of the cost of equipping an entire division.

As only a few of the carriers had actually installed any roadside equipment beyond the proportion mentioned, it was logical that efforts should be concentrated on a 20 or 25-mile section and on the six or eight locomotives required to secure this interim inspection. The Commission held out no promise that the interim inspection could be used as an excuse for failure to complete the entire

TABLE 1—PROGRESS MADE ON TRAIN CONTROL INSTALLATIONS UNDER FIRST ORDER.

Road	Maker of Train Control	Type of System	Mileage of Specified Division	Miles of Road Eq'd	Engines Eq'd
A. T. & S. F.	Union	Continuous	104.5	104.5	40
A. C. L.	General	Intermittent	114.5		
B. & A.	General	Continuous	101		1
B. & M.	Union	Continuous	105.6	13.8	4
B. & O.			36.3		
B. R. & P.	General		94	16	5
C. R. R. of N. J.	Union	Continuous	65.9		2
C. & A.	National	Intermittent	126.6	20	10
C. & E.			126.6		
C. & E. I.	Miller	Ramp	105.4	105.4	108
C. R. I. & P.	Regan	Ramp	165	165	102
C. & O.	American	Ramp	61		26
C. & N. W.	General	Continuous	149	22	3
C. B. & Q.	Sprague	Intermittent	82	20.7	8
C. I. & L.	Sprague	Intermittent	97	20	4
C. M. & St. P.	Union	Continuous	108	24.7	1
C. N. O. & T. P.	General	Intermittent	156.5	35.2	8
C. C. C. & St. L.	General	Continuous	128.3	20.9	1
D. & H.	General		113		
D. L. & W.	Union	Continuous	146	37	10
Erie			104.2	2	1
G. H. & S. A.	National	Intermittent	86.5	48	34
G. N.	Sprague	Intermittent	121	25	6
I. C.	Union	Continuous	123	22	10
K. C. S.	General	Intermittent	104	17	5
L. V.	General	Intermittent	65	28	10
L. I.	Union	Continuous	19.5	2.03	
L. & N.	Union	Continuous	165	17	5
M. C.	General	Continuous	74.5	20	5
M. P.	National	Intermittent	146	14	29
N. Y. C.	Sprague	Intermittent	148.5	20	15
N. Y. C. & St. L.	Union		142.6	10	3
N. Y. N. H. & H.		Continuous	62	23.7	10
N. & W.	Union	Continuous	108	108	14
N. P.	Sprague	Intermittent	109.3	21.5	6
O. W. R. R. & N.	Union	Continuous	84	17.7	2
Pennsylvania			83.2		
P. M.			60.9		
P. & L. E.	Union	Continuous	65.8	20	10
P. C. C. & St. L.			287		
R. F. & P.	Union	Continuous	101.6		
St. L. & S. F.	National	Intermittent	43.7	20	23
Reading	Union	Continuous	55.5	54	12
S. P.	National	Intermittent	75	51	73
Southern			153		
U. P.	Union	Continuous	102	60.1	15
W. J. & S. S.	Union	Continuous	58.5		

of the necessity for stopping trains when approaching a siding when a train was holding the main track for a meet.

The insertion of the permissive clause, which had long been advocated by the *Railway Age*, led several roads, which had not proceeded very far with their installations, to change their plans. For example, the Burlington discarded the speed control feature, thereby simplifying the roadside installation and reducing the apparatus on the locomotives.

The Commission recently ruled that if an automatic brake application had once been initiated, this application should continue through its course of action without interruption by any permissive feature or acknowledging device. The purpose of this ruling was to prevent an engineman from habitually annulling automatic brake applications without necessarily becoming alert to recognize the signal indications or conditions ahead. This requirement has been met by some manufacturers by

division by January 1, 1925. Therefore, perhaps with this idea in mind, some of the roads, such as the Norfolk & Western, the Atchison, Topeka & Santa Fe and the Galveston, Harrisburg & San Antonio, have completed their wayside control apparatus without requesting any interim inspections.

Six Roads Secure Interim Inspection

The Southern Pacific installation on 50 miles of single track and 24.4 miles of double track between Oakland, Cal., and Tracy, is 95 per cent completed. An official inspection of this installation was made by representatives of the Commission in August. The National Safety Appliance Company's intermittent inductive system of train control with the forestalling device is being used on this installation. Forty-three locomotives are equipped.

The Missouri Pacific train control installation on 14 miles of single track between Leeds, Mo., and Stillwell, Kan., was inspected by the Commission between September 1 and 12. In this instance the wayside apparatus of the National intermittent inductive system is superimposed into a controlled manual signal system by means of which the movements of trains are directed by signals without train orders. Ten freight and 19 passenger locomotives are now equipped.

The Pennsylvania installation of the Union Switch & Signal Company's three-speed continuous train control on the Lewistown branch was inspected by the Commission, starting on September 16. This installation was made primarily for the purpose of development and test and is not on the territory specified by the order of the Commission. The Commission's report of this interim inspection was published on page 957 of the *Railway Age* for November 22, 1924.

The 22-mile single track installation on the St. Louis-San Francisco, between Nichols, Mo., and Logan, was inspected by the Commission on October 15 to 18. This territory is a section of the division included in the Commission's order and is fully equipped with direct current automatic block signaling. The National intermittent inductive system is used, 19 passenger and 4 freight locomotives being equipped. No speed governor is employed on the locomotive, but intermittent speed limits are enforced by track circuit arrangements. At the time of the inspection two of the locomotives were equipped with the forestalling device.

The Great Northern installation of train control on 20 miles of single track from Minot, N. D., to Berthold, was inspected by representatives of the Commission on November 22 to 26. This road is using the intermittent inductive system of the Sprague Safety Control & Signal Corporation without the speed control features, six locomotives being now equipped.

Starting on December 1, the examiners for the Commission inspected the 20-mile double track installation of the Chicago & Alton between Normal, Ill., and Chenoa. This installation of the National system includes equipment for four passenger and six freight locomotives. None of the reports of the Commission concerning these inspections have been made public with the exception of that on the Pennsylvania.

Construction Progress on Other Roads

Having decided on the type of train control to be adopted, many carriers have entered on an intensive construction program to finish the roadside control installation on the 20-mile test sections as soon as possible. Three roads have carried their signal construction or reconstruction through the entire division and in some cases new pole lines were constructed throughout.

On the A. T. & S. F. the roadside equipment for the

Union continuous system has been completed on 104.5 miles of double track between Ft. Madison, Ia., and Chillicothe, Ill. This installation is unique in that no wayside signals are to be used except at interlocking plants, 12 of which were revised on this territory. Equipment for 100 locomotives has been ordered and 15 passenger and 25 freight locomotives have been equipped. The installation of the second division from Chillicothe to Chicago is proceeding rapidly, from 25 to 75 per cent of the various parts of the work being completed.

The Norfolk & Western has practically finished the installation of light signals and the Union continuous train control on 107 miles of single track between Shenandoah, Va., and Hagerstown, Md. Approximately 14 locomotives are equipped. Estimates have been completed and plans started for the work required on the division listed in the second order.

The Galveston, Harrisburg & San Antonio has practically completed the installation of the roadside equipment of the National intermittent induction system on 50.6

TABLE II—TESTS BY CARRIERS ON OTHER THAN REQUIRED DIVISION UNDER ORDER OF JUNE 13, 1922.

Carrier	Maker	Type	Miles of Road Equipped	Engines Equipped
Delaware & Hudson	General		4	2
Erie	Webb	Ramp	14	4
N. Y., C. & St. L.	Union	Continuous	9	2
Pennsylvania	Union	"	51	13
Pere Marquette	Clark	Wireless	1	0

miles of single track between Rosenberg, Tex., and Glidden. The equipment for the 17 passenger and 17 freight locomotives includes the forestalling device for the permissive train stop feature.

The Chicago & North Western has completed the installation of the General Railway Signal Company's continuous system on 20 miles of double track between Missouri Valley, Ia., and Council Bluffs. One passenger and two freight locomotives are equipped.

The Chicago, Indianapolis & Louisville has practically completed the signal changes and installation of the wayside apparatus on a 20-mile section using the Sprague intermittent induction system. Four locomotives have been equipped.

The Chicago, Burlington & Quincy has completed the wayside installation of the Sprague intermittent train control system on 20.7 miles of double track west of Creston, Ia. No speed governors are used on the locomotives, and as this is a train stop system the forestalling devices are used. Four passenger and 4 freight locomotives are equipped.

The Chicago, Milwaukee & St. Paul has installed the wayside control for the Union two-speed continuous system on 24.7 miles of double track between Bridge Switch, Minn., and Winona. One locomotive is equipped and apparatus for six others is being installed. Roundhouse stalls at Milwaukee, Wis., La Crosse and Minneapolis, Minn., have been wired for testing purposes.

The Cincinnati, New Orleans & Texas Pacific has finished a 35.2 mile, double-track section between Ludlow, Ky., and Williamstown. The General intermittent inductive auto-manual system is being used on this territory and eight locomotives have been equipped.

The Delaware, Lackawanna & Western has completed an installation of the Union continuous inductive system on 37 miles of double track and ten locomotives have been equipped. The tests of the Finnigan train control system are being continued and new units have been installed.

The Illinois Central has a 22-mile double track installation of the Union two-speed continuous system in service

between Champaign, Ill., and Tuscola, ten locomotives being equipped.

The Louisville & Nashville has installed the Union intermittent inductive train control on 17 miles of single track between Madisonville, Tenn., and Etowah. Three passenger and two freight locomotives are equipped.

The Michigan Central has 20 miles of double track equipped with the General continuous inductive system. Two passenger and three freight locomotives are equipped.

The New York Central has installed the Sprague intermittent inductive system on 20 miles of two passenger tracks just west of Hoffmans, N. Y. Ten passenger and five freight locomotives are equipped.

The Northern Pacific is using the Sprague intermittent inductive system and has 20 miles of roadside equipment in service just west of Mandan, N. D. Six locomotives are equipped.

The Oregon-Washington Railroad & Navigation Company has completed over half of the pole line and wayside apparatus on the 85-mile single track installation of the Union continuous system between East Portland, Ore., and The Dalles. Control equipment for six locomotives has been applied and other equipment is en route.

The Union Pacific is installing the Union continuous system on 102 miles of double track between Sidney, Neb., and Cheyenne, Wyo. Sixty miles of the installation is completed and half of the roadside and pole line work on the remainder of the territory is finished. Fifteen locomotives are equipped.

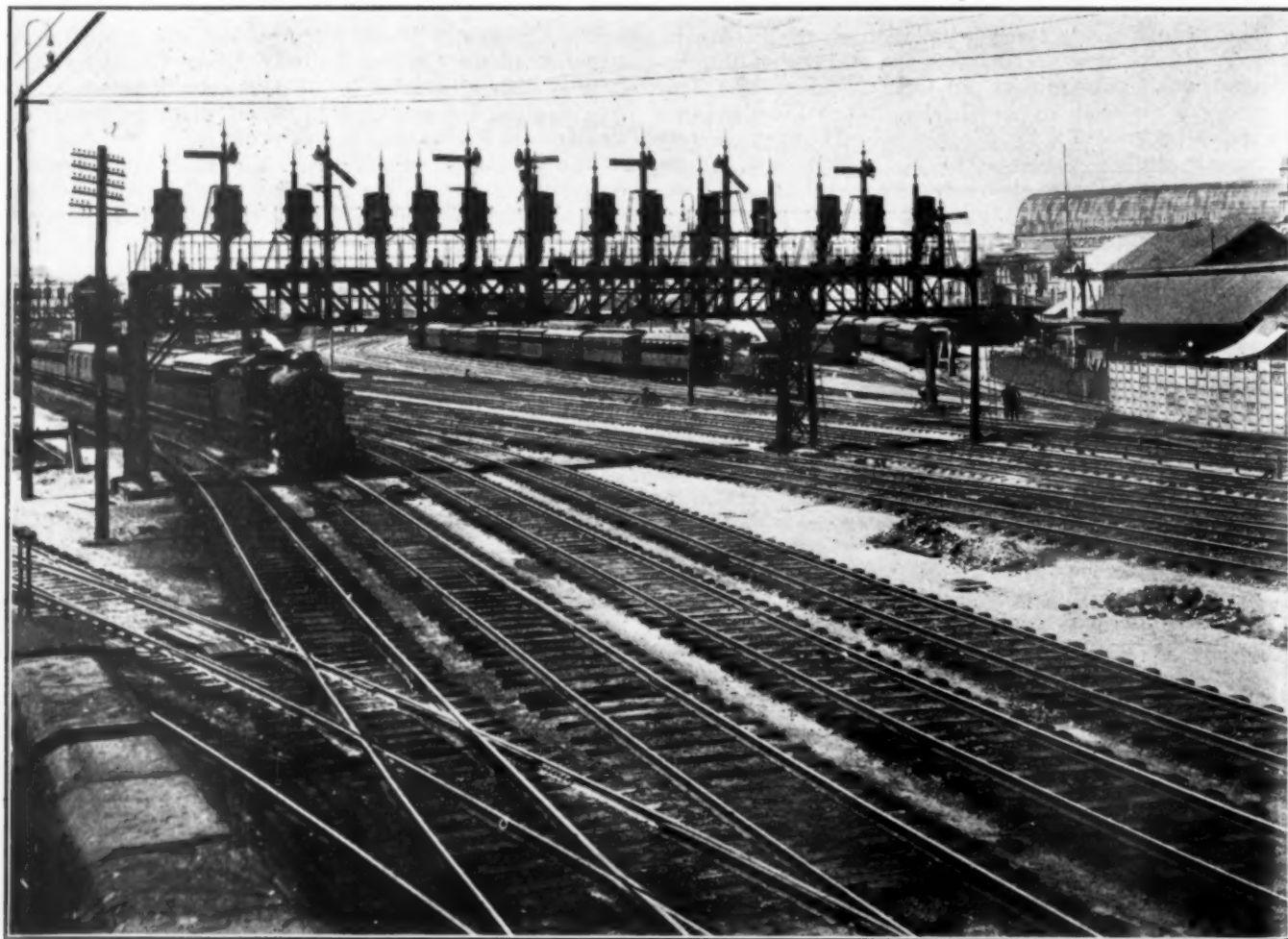
The Reading has 54 miles of double track equipped

with the Union continuous system east of Camden, N. J. Twelve locomotives have been equipped and apparatus for 13 more has been received.

As may be seen from Table I several of the other companies have made short test installations. Some of the roads have let contracts and have proceeded with pole line and signal changes, but have not as yet placed any train control apparatus in service. A few other roads have equipped one or two locomotives and a few track sections for test purposes.

The Baltimore & Ohio, the Erie, the Chicago & Erie, and the Pere Marquette have not as yet made any definite announcement as to a choice of the train control system to be installed. The Southern, although not having announced any contract for its own installation, is associated with the C. N. O. & T. P. on the installation and tests of the General Railway Signal Company's intermittent inductive auto-manual system.

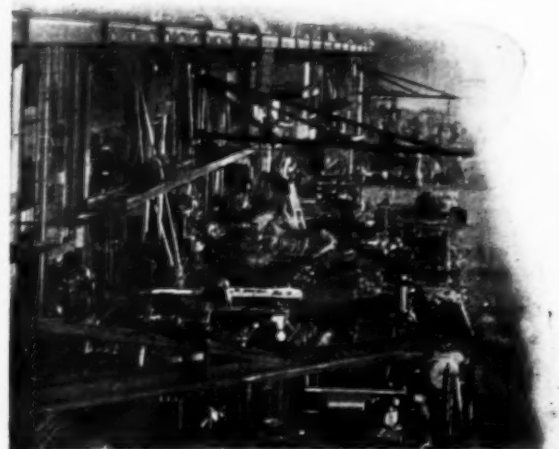
The Erie has a test installation of the ramp type of the International Signal Company's (Webb) system on 5 miles of double track with two passenger locomotives equipped, on the Northern division, and one mile of track with one freight engine equipped on the Delaware division. On its New York division a section of 4 miles of one track and one passenger engine is equipped with the Clifford system of train control. One locomotive has been equipped with the intermittent inductive system of the National Safety Appliance Company and equipment for one engine has been ordered for trial from the Sprague Safety Control and Signal Corporation.



Entrance to an Australian Railway Yard

Machine Tools Purchased During 1924

The trend of purchases indicates that the railroads are progressing in replacement of obsolete and worn-out machinery



THE railway industry is one of the largest purchasers of machine tools in the country. Since the return of the railroads to private operation, one of the important problems has been the reduction of repair costs to a minimum. That they have been somewhat successful in their efforts has been substantiated by maintenance statistics published during the past year. In order to reduce the cost of repairs, railway officers are coming to realize that it is imperative to retire old and obsolete machines and to replace them with modern tools. An outstanding recognition of this fact is contained in the article by L. F. Loree, president of the Delaware & Hudson, which appears elsewhere in this issue, in which he said: "Perhaps the point in which railroad facilities are the weakest is in the machine tool equipment of the repair shops. The development of machine tools received a great impetus from a war and from the growth of a new industry. During the last 15 years we have had the World War and the development of the automobile business. The effect has been to revolutionize machine tools and to render obsolete a large part of the machine tool equipment."

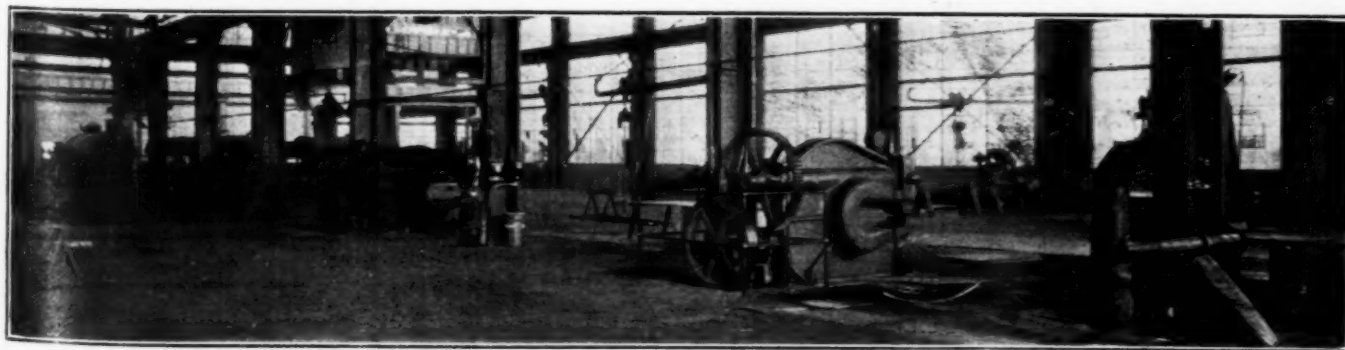
Expenditures made for shop machinery in 1924 and estimated expenditures for 1925 have been tabulated from data submitted by a group of railroads which represent over 50 per cent of the track mileage in the United States, Canada and Mexico. Using as a basis the railroads reporting machine tool expenditures, it is estimated that \$14,400,000 was spent for this purpose during the past year. The budget figures submitted indicate that the railroads of North America will spend practically \$17,-

000,000 for shop machinery in 1925, which will exceed last year's expenditures by \$2,600,000.

In the tables accompanying this article are shown the number and types of machine tools purchased by the railroads in 1924. This information was compiled from reports submitted by the railroads. For statistical purposes, the term "machine tool" has been defined to include blacksmith, boiler and car shop metal working or forming machinery, such as bulldozers, bolt machines, steam hammers, flue welding machinery, punches, shears, riveters, presses, etc., and car shop woodworking machines, as well as the metal cutting machines commonly classed as machine tools. Practically all of the railroads co-operated in furnishing data, submitting a list of the tools purchased where purchases had been made. The tables show that two railroads declined to report the machine tools which they had purchased during the year, on account of the expense involved in compiling the data.

In future years, the data in these tables will serve as a basis of comparison by which it will be possible to determine the trend of the railway machine tool market as well as the trend with respect to the types of machines being purchased. The tables show that the lathe, particularly the engine type, is by far the most widely used machine in railroad shops. Milling and grinding machines are fast assuming places of major importance in the shops, while the slotter is slowly being replaced by machines of other types.

Included under the column headed "other lathes" are nine tool room lathes and two automatic screw machines; under "miscellaneous drill presses" are 17 sensitive drill presses; under "miscellaneous grinding machines" are 24 drill grinders, 51 double-end wet and 32 double-end dry emery grinders and 17 tool grinders; under "miscellaneous milling machines" are 10 plain and 3 vertical milling machines, and under "portable machine tools" are 22 cylinder boring machines, 13 valve facing machines and 7 crank-pin turning machines. The column headed "other presses" includes 18 bushing presses, 4 crank pin presses and 24 unclassified hydraulic presses. Various types of tin shop equipment were listed by the railroads, the principal item being the cornice brake. The National Railways of Mexico made the largest purchase of tin shop machinery.



The Boiler Shop Received a Fair Share of New Tools in 1924

Purchaser	Lathes					Drill Presses		Planers	Shapers	Slotters	Boring Mills		Milling Machines		Grinding Machines			Double Tool & Others	Metal Cutting Saws	Portable Boring and Turning Machines	Bolt Cutters and Threaders	Pipe Cutters and Threaders
	Axle	Engine	Turret	Wheel	Others	Radial	Vertical and Others				Horizontal	Vertical and Others	Universal	Horizontal and Others	Cylindrical	Internal	Surface					
Alabama & Vicksburg	4	24	12	1	2	10	19	1	5	1	3	5	2	3	2	4	4	25	2	4	1	4
Alchison, Topeka & Santa Fe			1																			
Atlanta & West Point																						
Atlantic City							1							1				2		1	2	
Atlantic Coast Line		1					2	1														
Baltimore & Ohio								No report received										3				
Bangor & Aroostook							1															
Bessemer & Lake Erie																						
Boston & Albany	1	4	1	1		2			1												2	
Boston & Maine	2		1			2	1		1			3	1		1	1		3	1			
Canadian National								No report received														
Canadian Pacific	2	6	3	2			1		4							2	2	2	1			1
Central of Georgia	1	4			1		2		4	1	1	1						4	1	2		
Central of New Jersey			1															1				
Chesapeake & Ohio		1	3	1	2			1	1		1			1				5	3	2		1
Chicago & Alton																						
Chicago, Burlington & Quincy		1					2				3	1		1				4			1	1
Chicago Great Western		4																1				
Chicago, Indianapolis & Louisville																		1	1			
Chicago & North Western																						
Chicago, Milwaukee & St. Paul								Declined to report														
Chicago, St. Paul, Minneapolis & Omaha																						
Chicago, Rock Island & Pacific	3		1		1		1						2	1				1	1	2		1
Chicago & Western Indiana							1															
Cincinnati, Indianapolis & Western																						
Cincinnati Northern		1																				
Clev., Cin., Chicago & St. Louis	2	6	1	1	1	4	5		2			1		1		1		6	1	8		
Colorado & Southern																						
Delaware & Hudson		1					1		1									1				
Delaware, Lackawanna & Western	3		1				2				2											1
Denver & Intermountain																						
Denver & Salt Lake								No report received														
Denver & Rio Grande Western																			1			2
Detroit, Toledo & Ironton																1						
Duluth, Missabe & Northern							1											2				
Duluth, South Shore & Atlantic		2					1						1									
East Broad Top																			1			
Elgin, Joliet & Eastern																						
Erie	1	2			1		3		3			1	1			1		8		2	2	1
Florida East Coast		2	3				1		4									1			3	1
Grand Trunk Lines in U.S.								No report received														
Great Northern		1	1									2										
Gulf Coast Lines									1													
Gulf, Mobile & Northern								1														
Hocking Valley			1				1														1	
Illinois Central	1																	1				
Jonesboro, Lake City & Eastern							1												1			
Kansas City Southern	1	5	4	1	2	2	3	1	2		1	1	1			1	10	1		2	3	
Lake Superior & Ishpeming																						
Lehigh & New England		2	1				1	1	1													
Lehigh Valley	2	6	4	1		5		6	5			3						1				
Long Island		5					1	1	1												1	
Los Angeles & Salt Lake		6	3		1	2	7	1	2	1		1				1	1	9	2	2	2	
Louisville & Nashville	11					1	6	3	3	1		3				1	1	4	2		3	
Maine Central		5					1												1			
Maryland & Penna.			1																			
Michigan Central		2	1				3	1	2									4		1	1	1
Minneapolis & St. Louis								No report received														
Minneapolis, St. Paul & Sault Ste. Marie		3																2				
Missouri-Illinois																			1			
Missouri-Kansas-Texas							1		1												1	
Missouri Pacific		12	5			11	2	2	2	2	2	9	4	2	1	1	1	18	4		3	8
Nashville, Chattanooga & St. Louis		1					1		1									5				
National Railways of Mexico		1	14	2			3	2		1		3		6					1	6		
Nevada Northern																						
New York Central		26	8			5	7	3	2	2		1		5	1	1	1	9	1		7	5
New York, Chicago & St. Louis		2	1									1						1		1	2	
New York, New Haven & Hartford																		1	1	4		
New York, Ontario & Western																						
Norfolk Pacific	1		1															3		3		2
Norfolk Southern																						
Norfolk & Western	4	13	1			4	3	3	4	2	2	9		2				19	3		1	3
Oregon Short Line		2			1	1	3		1									2		2		
Oregon-Wash. R.R. & Navigation Co.			1									1										
Pennsylvania	1	5	6		1	2	2	2	1			1	2	1	3			10		8	1	2
Pittsburgh & Lake Erie		2	2				1											2				
Quebec Central							1															
Quincy, Omaha & Kansas City																						
Richmond, Fredericksburg & Potomac		2					1					1				1						2
Rutland																						
St. Louis-San Francisco	1																					
St. Louis Southwestern		7					1		3					1		1		4			1	1
San Antonio & Aransas Pass																						
Seaboard Air Line								No report received														
Southern Pacific								Declined to report														
Southern Railway	3	18	6	1	2	11	6	5	10		1	13	3	6		2	4	9	2		12	1
Spokane, Portland & Seattle		1	1										1								1	
Sugar Land		1					2	1											1		1	
Union Pacific	2	6	1			1	2	1	3	1		5			1	1		2		1	2	
Union Refrigerator Transit Co.																						
Virginian								No report received														
Wabash		3	2			1	4			2				1				1	2			1
Western Pacific																		3		1		
Wheeling & Lake Erie		2					2															
TOTAL	35	209																				

Purchaser	Presses		Hammers		Forging Machinery		Punches	Shears	Combination Punch and Shear	Flue Shop Machinery				Boiler Shop Machinery		Wood Working Machinery						
	Wheel Presses	Other Presses	Steam	Other Power	Bull-dozers	Forging Machines				Flue Cutters	Flue Wedges	Flue Welders	Misc.	Flanges	Forming Clamps	Rolls	Boring Machines	Notchers	Surfacing Tenoners	Wood Cutting Saws	Other	
Alabama & Vicksburg																						
Achison, Topeka & Santa Fe		3	2			2	1	3			4	2	5	7		2	5		1	1	3	3
Atlanta & West Point																						
Atlantic City																						
Atlantic Coast Line								1														
Baltimore & Ohio										No Report Received												
Bangor & Aroostook									1													
Bessemer & Lake Erie																						
Boston & Albany		1					1					1						1				
Boston & Maine	1	1						2	1			1	1							1		
Canadian National										No Report Received												
Canadian Pacific		1			1			1	1					1	1							
Central of Georgia				1		2		1										1				
Central of New Jersey		1										1										
Chesapeake & Ohio		3						1			4											
Chicago & Alton																						
Chicago, Burlington & Quincy				1	2			2	6												1	
Chicago Great Western																					2	
Chicago, Indianapolis & Louisville																						
Chicago & North Western																						
Chicago, Milwaukee & St. Paul										Declined to Report												
Chicago, St. Paul, Minneapolis & Omaha																						
Chicago, Rock Island & Pacific	2	1														1	2		1	2		
Chicago & Western Indiana																1				2		
Cincinnati, Indianapolis & Western	1																					
Cincinnati Northern																						
Clev., Cin., Chicago & St. Louis	1	1						3												3		
Colorado & Southern																						
Delaware & Hudson																						
Delaware, Lackawanna & Western	1		1						1													
Denver & Intermountain																					1	
Denver & Salt Lake										No Report Received												
Denver & Rio Grande Western		1			2	1		2												1	1	
Detroit, Toledo & Ironton																						
Duluth, Missabe & Northern								1										1			2	
Duluth, South Shore & Atlantic																						
East Broad Top																						
Elgin, Joliet & Eastern						1																
Erie		2		1				2				1						1	1	1	2	
Florida East Coast		1																				
Grand Trunk Lines in U.S.										No Report Received												
Great Northern	1																					
Gulf Coast Lines		1																				
Gulf, Mobile & Northern																						
Hocking Valley		1																			1	
Illinois Central																						
Jonesboro, Lake City & Eastern																						
Kansas City Southern	1	2	2		2	1		1			1			1	1			1			2	
Lake Superior & Ishpeming																					1	
Lehigh & New England																						
Lehigh Valley																						
Long Island		1	1					1				1		1								
Los Angeles & Salt Lake		3	1	1								1				1	1	1		2		
Louisville & Nashville	1	1	1						1			1										
Maine Central		1																1		1		
Maryland & Penna.									1						1							
Michigan Central	1	4						1	3			1	1	4				1	1	1		
Minneapolis & St. Louis										No Report Received								1	1	1		
Minneapolis, St. Paul & Jault Ste. Marie																						
Missouri-Illinois		1																				
Missouri-Kansas-Texas																						
Missouri Pacific	2	9	1				2	2	5	3		3	3	2					2	9	1	
Nashville, Chattanooga & St. Louis									1					1								
National Railways of Mexico	1	3	2	1				2	2							2	2	2	2	1	3	2
Nevada Northern																						
New York Central		7	1		1	2		1	2			1		1		1					2	
New York, Chicago & St. Louis							1							1								
New York, New Haven & Hartford									1													
New York, Ontario & Western													1									
Northern Pacific		1									1		2	1		1					1	
Norfolk Southern																						
Norfolk & Western	3	2					1													4	1	
Oregon Short Line				1	1		1	2			1		1							2		
Oregon-Wash. R.R. & Navigation Co.																					2	
Pennsylvania			1	1				1											1			
Pittsburgh & Lake Erie														1								
Quebec Central																						
Quincy, Omaha & Kansas City																1						
Richmond, Fredericksburg & Potomac									1							1						
Rutland	1		1																			
St. Louis-San Francisco																						
St. Louis Southwestern														1				1		11	5	
San Antonio & Aransas Pass																						
Seaboard Air Line										No Report Received												
Southern Pacific										Declined to Report												
Southern Railway	2	3	5	5	2	3	3	3	3			2	1	1		2	2	2	4	5	8	5
Spokane, Portland & Seattle																						
Sugar Land																						
Union Pacific	1																	1			2	
Union Refrigerator Transit Co.																1		1				
Virginian										No Report Received												
Wabash		1						1	1					1								
Western Pacific																						
Wheeling & Lake Erie		1																				
TOTAL	20	58	19	12	11	12	13	41	22	13	3	22	16	13	4	12	10	13	17	12	62	32

Signal and Interlocking Construction



Electro-Mechanical Interlocking on Santa Fe

*More apparatus
installed in 1924 than
any year
since 1919—
Even better prospects
for 1925*

By John H. Dunn



Color-Light Automatic Signals on G. N.

SIGNAL and interlocking construction during 1924 showed a healthy increase over that of the preceding year, especially single track automatic block signaling and power interlocking. Uncertainty regarding the requirements of the Interstate Commerce Commission for train control installations tended to curtail the expenditures for signaling to a considerable extent; therefore in the majority of cases only those signaling projects were carried out which gave promise of decided savings. In spite of this condition more miles of signaling and more levers of interlocking were placed in service during the past year than in any previous year since 1919. This fact is evidence of the recognition which is being accorded signaling facilities as an effective and economical means of increasing track capacity.

Résumé of the Activities of the Year

During the year which has just closed, automatic block signals were installed on 1,564 miles of single track road, an increase of 336 miles over the figure for 1923. Signals were also installed on 764 miles of double track lines, as compared with 746 miles the year before. With the exception of four or five complete division installations, these signals were built in short stretches to close gaps between older signaling or to provide protection on sections of heavy curvature or through stations. Also, in numerous instances short stretches of signals were installed near terminals or on grades to permit the closer spacing of train, thus increasing track capacity.

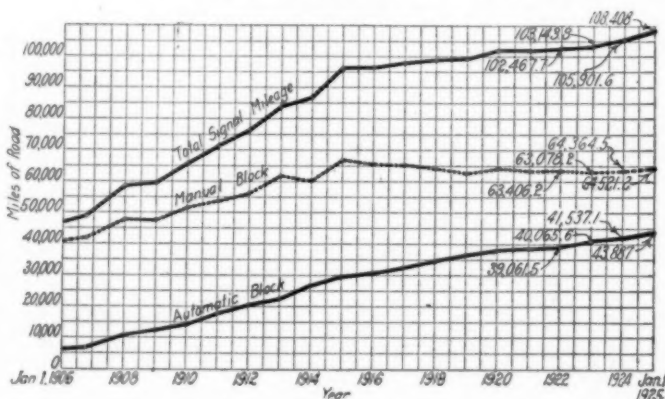
The light signal is increasing in favor as compared with the older semaphore type, especially for new installations on complete divisions. The color-light and the position-light signals have both been undergoing considerable development and the position-color light signal is being applied on one road, the Baltimore & Ohio. The recent development of a new lens for light signals gives promise of a 50 per cent reduction in the amount of power consumed by the lamps.

During 1924, 106 new interlocking plants were constructed in the United States and Canada, as compared with 108 in 1923. These new plants involved 774 mechanical levers and 1,712 power levers, or a combined total of 2,486 levers, which exceeds by 455 the number installed in the previous year. Several large terminal and yard plants were installed to eliminate congestion at such points.

However, perhaps greater interest is being taken in the combination of smaller plants, low-voltage remote control, and automatic interlockings.

Many mechanical plants have been rebuilt and converted into electro-mechanical plants, adding electric units to handle the signals or to control low-voltage units for remote switches. In some cases the controls for two plants have been combined, thus eliminating one set of towermen.

Several roads are beginning to operate automatic interlockings successfully. These plants are adaptable to



Curves Showing Growth of Block System

simple grade crossing layouts in which switches are not involved and where derail protection is not used. The signals are controlled automatically by the approaching trains, the circuits being so interlocked as to give signal protection. As no levermen are required, these plants show decided savings at crossings where trains are now required to stop. Some roads are considering the revision of existing outlying plants to embody the automatic principle, thereby eliminating the necessity for levermen.

The subject of train control, although fundamentally a signaling problem, is of such importance at this time that it is treated in a separate article elsewhere in this issue.

Block Signaling Completed in 1924

A total of 2,293 miles of road, involving 3,293 miles of track, was equipped with automatic block signals in the

TABLE A—AUTOMATIC BLOCK SIGNALS INSTALLED IN 1924

Road	From—	To—	Mi. of road	No. of signals	No. of signals
			Single track	Semaphore	Light
A. T. & S. F.	Hu Tower	Melvorn	19.6 d	22 S	22 L
	Melvorn, Kan.	Ridgerton	8.0 s	7 S	7 L
	Emporia, Kan.	Plymouth	8.1 d	9 S	9 L
	Otero, N. M.	Hebron	6.6 s	7 S	7 L
	Hebron, N. M.	French	19.7 s	32 S	32 L
	Domingo, N. M.	Hahn	33.5 s	50 S	50 L
	Sand Creek, Kan.	No. Ft. Worth	1.2 d	10 S	10 L
	Ft. Worth, Tex.	Rio Puerco	8.7 d	13 L	13 L
	Dalies, N. M.	Gallup	15.6 d	20 L	20 L
	Perea, N. M.	Defiance	8.0 d	11 L	11 L
	Gallup, N. M.	Horace	24.0 d	28 L	28 L
	Baca, N. M.	Bakersfield	2.5 d	7 L	7 L
	Kern Jct., Cal.	Summit	44.2 d	57 L	57 L
	Hicks, Cal.	Opelika	21.4 s	20 S	20 S
A. & W. P.	West Point, Ala.	Hornady, Ala.	30.83 d	58 S	58 S
	Yemassee, S. C.	Hardeeville, S. C.	7.4 s	6 S	6 S
A. C. L.	Uceta, Fla.	Tampa	3.52 d	9 S	9 S
	Jesup, Ga.	Folkston, Ga.	54.02 s	95 S	95 S
B. & O.	Deshler, Ohio	Hamler	8.0 d	16 L	16 L
Can. N.:					
(Can. Reg.)	Pt. St. Charles, Que.	Lachine Canal	2.1 d	5 L	5 L
	Pointe Claire, Que.	Coteau Jct.	23.15 d	35 L	35 L
	Pt. Hope		1.0 d	1 S	1 S
	Kingston Jct., Ont.		4.0 d	4 L	4 L
	Cobourg, Ont.		1.0 d	1 S	1 S
	Copperville, N. H.		1.0 s	1 S	1 S
	London Ont.	Komoka	10.0 d	13 L	13 L
	Aldred Jct., Que.		3.0 s	2 S	2 S
(West Reg.)	Westfort, Ont.	Twin City	6.0 d	13 L	13 L
	Marchand, Man.	M. P. 101.9	5.1 s	8 S	8 S
	Sioux Lookout, Ont.	Superior Jct.	5.1 s	8 S	8 S
	Regina, Sask.	M. P. 2.2	1.7 s	4 L	4 L
	Man. W. Va.	Steamwell	10.0 s	28 L	28 L
C. & A.	Corwith, Ill.	Lambert	15.0 d	31 S	31 S
	Normal Yd., Ill.	Bloomington	5.6 d	11 S	11 S
C. & N. W.	Chase, Wis.	W. Allis	5.0 d	11 L	11 L
	Melrose Park, Ill.	Elmhurst	4.0 d	6 L	6 L
	Elmhurst, Ill.	W. Chicago	13.0 (3t)	52 L	52 L
C. & W. I.	55th St., Chicago	81 St. Chicago	3.8 d	18 S	18 S
C. B. & Q.	Alma, Wis.	Purdy	13.36 d	25 L	25 L
	Stockholm, Wis.	Diamond Bluff	23.8 s	51 L	51 L
C. R. I. & P.	Latimer, Kan.	Herington	7.0 d	6 S	6 S
	Chicago, 25th St.	Chicago, 59th St.	4.1 d	20 L	20 L
C. M. & St. P.	Delmar, Ill.	Tallmadge	4.6 s	10 S	10 S
D. L. & W.	Lincoln Pk., N. J.	Boonton	7.0 (3t)	39 S	39 S
Erie	Croton, N. J.	Hackensack Riv.	2.3 d	19 L	19 L
G. N.	Wolf Point, Mont.	Havre, Mont.	188.97 s	292 L	292 L
	Staples, Minn.	Clearwater Jct.	1.66 d	2 S	2 S
I. C.	Blue Island, Ill.	Branch	0.4 s	2 L	2 L
	Chicago		0.5 s	2 L	2 L
	Otto, Ill.	Gilman	19.2 d	147 L	147 L
	Carbondale, Ill.	Illinois Jct.	54.2 d	89 L	89 L
I. R. T.	New York			13 L	13 L
K. C. S.	Oskaloosa, Mo.	Pittsburg, Kan.	14 s	24 S	24 S
L. V.	Potter, N. J.	New Market	2.36 d	10 L	10 L
	New Market, N. J.	Bound Brook	4.62 d	18 L	18 L
	Stockton, Pa.	Hazleton Shaft	.88 d	4 L	4 L
	Oneida Jct., Pa.	Lofty	8.88 d	24 L	24 L
L. I.	Hillside, N. Y.	Floral Park	6.0 (4t)		
L. & N.	Montgomery, Ala.	Mobile	173.0 s	294 S	294 S
			3.0 d	57 L	57 L
M. K. T.	Hillsboro, Tex.		4.2 s	10 S	10 S
	Hillsboro, Tex.		4.3 s	10 S	10 S
	Temple, Tex.		1.3 s	7 S	7 S
	Granger, Tex.	Granger, Yd.	3.6 s	3 S	3 S
M. P.	Martin City, Mo.	Bucyrus, Kan.	14 s	28 S	28 S
	Nevada, Mo.	Nassau Jct.	2 s	2 S	2 S
	Cotton Belt Jct., Ark.	Br. 477	2.6 d	9 L	9 L
	Little Rock, Ark.	Fairground	1.0 d	2 S	2 S
Monongahela	Penn., W. Va.				
	State Line	Morgantown	10.19 s	24 L	24 L
N. & W.	Shenandoah, W. Va.	Hagerstown, Md.	108 s	204 L	204 L
	Ft. Gay, W. Va.	Kenova	26 d	62 S	62 S
N. P.	Little Falls, Minn.	Staples	27.5 s	59 S	59 S
			6.3 d		
N. Y. C. & St. L.	Conneaut, Ohio	Thornton, Pa.	10.0 d	13 L	13 L
	Bluffton, O.		3.6 s	4 L	4 L
N. Y. C.	Rotterdam Jct.	Harbor, N. Y.	65.0 d	133 L	133 L
	Weehawken, N. J.	National Jct.	4.34 d	11 L	11 L
	Amboy, N. Y.	South Palmyra	54.7 d	83 L	83 L
	Dumont, N. J.	West Nyack	10.4 d	14 L	14 L
	Valhalla, N. Y.	Mt. Kisco	11.2 d	14 L	14 L
	Buffalo, N. Y.	Ruffalo Creek	0.9 d	36 L	36 L
	Beacon, N. Y.	Chelsea	5.3 d	13 S	13 S
	Madison, O.	Plainesville	10.0 d	20 L	20 L
	Graytown, O.	Millbury	9.0 d	40 L	40 L
	Post Road, N. Y.	Selkirk	5.9 d	12 L	12 L
	Waverly, N. Y.	Selkirk	3.3 d	7 L	7 L
B. & A.	Niwerly, N. Y.	Post Road	2.5 s	2 L	2 L
C. C. C. & St. L.	Pana, Ill.	Lenox	70.6 d	121 S	121 S
M. C.	Jackson, Mich.	Rives Jct.	10.0 d	22 S	22 S
Chi. Jct.	Calumet Ave.	Lake Park Ave.	1.1 s	1 L	1 L
Penna.	Swissvale, Pa.	Wilmerding	6.0 f	50 L	50 L
	M. B. Bridge	12th St.	0.5 f	6 L	6 L
	Ingram, Pa.	Carnegie	1.7 d	9 L	9 L
			0.8 d		
	Mosier	Boanna	6.8 d	11 S	11 S
P. M.	Detroit, Mich.	Plymouth	17.0 d	26 L	26 L

Road	From—	To—	Mi.	No. of signals
S. P.	Ashland, Ore.	Hito	64.5	114 S
	Zuleka, Cal.	Cal-Ore Line	2.2 s	7 S
	Cal-Ore Line	Clawson, Ore.	10.5 s	29 S
	Eugene, Ore.	Powers	10.6 s	8 S
	Wyo, Cal.	Tehama	3.7 s	2 S
	Roseville, Cal.	Marysville	14.5 s	14 S
	Indio, Cal.	Niland	54.5	102 S
	Lordsburg, N. M.	Mongola	47.5	87 S
	Niland, Cal.	Calexico	14.5	24 S
Tex. & La.	Toronto, Tex.	Sta	4.3 s	6 S
	Alpine, Tex.	Sta	6.9 s	12 S
	Paisano, Tex.	Sta	5.9 s	6 S
	Marfa, Tex.	Sta	5.1 s	6 S
	Uvalde, Tex.	Sta	5.5 s	6 S
	Sabinal, Tex.	Sta	5.6 s	6 S
	Macdonia, Tex.	Sta	4.6 s	6 S
	Neonan, Tex.	La Coste	12.1 s	18 S
	Cline, Tex.	Hacienda	12.5 s	22 S
	Spofford, Tex.	Sta	5.8 s	6 S
	Bayou Sale, La.	Carde	37.3 d	97 S
	Englewood, Tex.	Eureka	8.0 d	40 S
	Nacogdoches, Tex.	Bonita Jct.	0.5 s	4 S
	Grayton, Tex.	Ysleta	87.8 s	189 S
	Corsicana, Tex.	Sta	6.0 s	9 S
	Hammond, Tex.	Bremond	10.5 s	20 S
Sac. Nor.	Sacramento, Cal.		0.3 s	4 L
Southern	Austell, Ga.	Oxanna, Ala.	85.5	143 L
St. L.-S. F.	Monett, Mo.	Fulsa, Okla.	134.7 s	273 S
			6.4 d	
U. P.:				
O. S. L.	Nampa, Ida.	Perkins	14.2 s	34 S
	Hammett, Ida.	Chalk	5.4 d	19 S
	S. P. Jct., U.			1 S
	Orchard, Ida.		1.5 s	
W. P.	M. P. 537	M. P. 713	177 s	
			1,563.92 s	2,278 S
			764.30 d	2,002 L

s=single track
d=double track
t=three track
S=semaphore signal
L=light signal

United States and Canada during 1924. Single track signaling was installed on 1,564 miles of road. The four largest installations included in this total are 189 miles of light signals on the Great Northern, 134 miles of semaphore signals on the St. Louis-San Francisco, 178 miles of semaphores on the Louisville & Nashville, and 108 miles of light signals on the Norfolk & Western. These four outstanding division installations on single track were provided as important features of signaling programs with a view of securing added track capacity and greater safety of train operation.

The 764 miles of double track equipped with automatic signals in 1924 comprises rather short installations. Exceptions to this rule include 44.2 miles of light signaling on the Atchison, Topeka & Santa Fe, 70 miles of semaphore signals on the Cleveland, Cincinnati, Chicago & St. Louis and 177 miles of signals on the Western Pacific, installed on the line now being used for joint double track operation with the Southern Pacific. The Canadian National relieved congestion on 23.15 miles of double track by installing light signals. The Illinois Central replaced semaphore gas signals with color-light signals on 65 miles of double track.

Of all automatic signals reported as installed in Canada and the United States in 1924, 2,278 are semaphore and 2,002 are light signals. Nine hundred and thirty-six of the semaphores are of the lower quadrant type and 1,142 of the upper quadrant type. With few exceptions all semaphore signals installed are equipped for electric lighting. Of the total of 2,002 signals, 284 were of the position-light type, and 1,718 color-light.

The reports show that the construction of manual block signaling during 1924 was practically limited to one road, the Rutland, which installed manual block semaphore signals at 28 stations on 145.7 miles of single track. This road contemplates the installation of manual block signals during the next year at 17 different stations on 94 miles of single track.

Block Signaling Under Construction

As the year 1924 closed, 478 miles of single track and 395 miles of double track signaling were under construc-

tion on 875 miles of road. None of these installations are in Canada, and in fact, the larger ones are all in the southern part of the United States where the colder weather does not interfere with outside work during the winter. The Louisville & Nashville has 141 miles of single and 34 miles of double track signaling under way while the Atlantic Coast Line is working on 189 miles of double track automatics.

Interlocking Construction in 1924

During the year just closed, 106 new interlocking plants were built in the United States and 14 in Canada. The Chicago Union Station placed 132 levers of electro-pneumatic interlocking in service and the Reading installed a 57-lever plant of the same type at Camden, N. J. The largest electric plant installed in 1924 was completed by the Chicago & Western Indiana, involving 79 levers, while the next largest, installed by the New York Central at Selkirk, N. Y., contains 60 levers.

The tendency toward the use of the electro-mechanical

by 'electric levers and are operated by remote control low-voltage switch machines.

Desk Controllers and Remote Control Machines

Another important development of 1924 was the increasing use of desk-type circuit controller interlocking plants. These small units may be installed in gatemen's shanties, on operators' desks, etc., and are used to control switches, derails, and signals for passing-tracks, ends of double tracks and junctions. These controllers may be handled

TABLE C—AUTOMATIC BLOCK SIGNALS CONTEMPLATED FOR 1925

TABLE B—AUTOMATIC BLOCK SIGNALS UNDER CONSTRUCTION DEC. 31, 1924

Road	From	To	Mi. of road Single track Double	No. of signals Semaphore Light
A. T. & S. F.	Suwanee, N. M.	McCartys	34.2 d	34 L
A. C. L.	Parkton, N. C.	Pec Dee, S. C.	56.11 d	105 S
	Java, S. C.	Lanes	46.13 d	90 S
	Drayton Hall, S. C.	Yemassee	49.42 d	100 S
	Burroughs, Ga.	Doctortown	1.82 s	77 S
			37.57 d	24 L
B. & O.	St. George, N. Y.	South Beach	4 d	41 L
	Clifton Jct., N. Y.	Tottenville	12.5 d	76 L
C. R. R. of N. J.	Lakehurst, N. J.	Winslow Jct.	38 s	9 L
C. & O.	Clyffside, Ky.	W. Ashland	4 d	6 L
	Clyffside, Ky.	W. Ashland	4 d	12 L
C. & N. W.	W. Ashland, Ky.	Russell	3.3 d	15 L
	Kickapoo, Ill.	Radnor	2.0 s	15 L
I. R. T.	New York		7.0 d	161 L
I. C.	Wilderman, Ill.	Layfield	85.2 s	2 L
	Boyd, Ia.	Pt. Dodge	0.1 d	34.0 d
L. & N.	Memphis, Tenn.	McLemore Ave.	141.0 s	16 d
	Louisville, Ky.	Montfort, Tenn.	34.0 d	32 S
	N. Hazard, Ky.	Perritt	16 d	4 L
M. P.	Bucyrus, Kan.	Osawatimie	21.1 s	2 S
N. Y. O. & W.	Winton, N. Y.		2 d	68 L
	Burnside, N. Y.	Churchville	1 d	12 L
N. Y. C.	So. Palmyra, N. Y.	Katonah	34 d	40 L
	Mt. Kisco, N. Y.	Toledo, O.	5.4 d	18 S
M. C.	Detroit, Mich.	Tunnel No. 4	43.0 d	32 S
N. & W.	Tunnel No. 1, Va.	Tunnel No. 4	10.0 d	7 S
	Webb, W. Va.	Ft. Gay	15.5 d	4 S
Penn.	Leetonia, O.	Salem	8 s	2 S
	Crosscut, Pa.	Fderburg	4.2 d	1 L
	Struthers, O.	Hazelton	1.7 d	10 L
	Boanna, O.	Niles	1.2 d	31 L
	Sizerville, Pa.		5 d	64 S
Reading	Cincinnati, O.	W. N.	11.2 s	22 S
S. P.	Bryn Athyn, Pa.	Newton	31.6 s	14 S
	Elmhurst, Cal.	Santa Clara	11.8 s	1 L
	Redwood Jct., Cal.	Niles Jct.	4.9 d	8 S
	Yuma, Ariz.	Ivalon	3.8 d	117 L
	Sparks, Nev.	Vista	30 d	35 S
Tex. & La.	Emigrant Gap, Nev.	Andover	14.2 s	12 S
	Hot Wells, Tex.	Grayton	1.9 d	6.3 c
Southern	San Antonio, Tex.	Yard	9.0 d	63 S
	Ozanna Jct., Ala.	Birmingham	27.8 s	2 L
U. P.	Orchard, Ida.	Perkins	2.7 s	8 S
O. S. L.	Nampa, Ida.	Nampa Loop	0.3 s	697 S
W. P.	M. P. 178.5	M. P. 178.8	477.6 s	770 L
			395.2 d	3.3 t

machine for the smaller interlockings is evidenced by the fact that 24 such plants, including 162 mechanical and 180 electric levers, were installed last year. A typical installation where this type of machine was used to advantage was at Ellinor, Kan., on the A. T. & S. F. The main line switches and cross-overs in the vicinity of the tower at this point are handled mechanically, while the distant junction switch and derails 4,000 ft. away are controlled

Road	From	To	Mi. of road Single track Double	No. of signals Semaphore Light
A. T. & S. F.	Burton, Kan.	Hutchinson	13.9 d	10 S
	Offene, Kan.	Wright	20.1 d	30 S
	French, N. M.	Shoemaker	51.3 s	92 S
	Thackerville, Okla.	Ardmore	27.4 s	47 S
	Ponetta, Tex.	Meridian	33.2 s	52 S
	Defiance, N. M.	Chambers, Ariz.	43 s	42 L
	Hobart, Okla.	Fullerton, Tex.	17 s	8 L
A. & W. P.	Opelika, Ala.	Montgomery	63 s	10 L
B. & O.	Waverly, Md.	Mt. Royal	2.0 d	132 L
	Camden Sta., Md.	Bailey	0.7 d	54 L
	New Castle Jct. Pa.	Akron Jct., O.	71.0 d	2 S
	Sterling, O.	Greenwich	35.0 d	4 L
C. N.	Stanley Jct., N. B.		0.5 s	124 L
	Mont. Joli, Que.		3 s	32 L
C. P.	Virden, Man.	Whitewood, Sask.	70 s	39 L
	Beavermouth, R. C.	Connaught	18 s	21 S
	Glacier, B. C.	Albert Canyon	22 s	20 L
D. L. & W.	Lyndhurst, N. J.	Paterson, Jct.	5.36 d	200 L
Erie	Jersey City, N. J.	Croton	1.04 (4t)	225 L
G. N.	Williston, N. D.	Wolf Point, Mont.	106.78 s	31 S
	Havre, Mont.	Cut Bank	28.65 d	22 S
	Cut Bank, Mont.	Blackfoot	25.91 d	10 S
	Summit, Mont.	Java	14.32 d	134 L
	Columbia Falls, Mont.	Whitefish	7.64 d	1 S
M. K. T.	Parsons, Kan.	Paola	94 s	1 S
	Atoka, Okla.		1.5 s	4 L
	Dallas, Tex.		3.5 s	30 L
N. Y. C.	Katonah, N. Y.	Dykemans	15.3 d	16 L
	Stuyvesant, N. Y.	Schodack Jct.	8 d	52 L
N. Y. O. & W.	Walton, N. Y.	Sidney	22 s	5 S
N. Y. N. H. & H.	Oak Point, Mass.	Fresh Pond	8.06 (5t)	260 L
N. & W.	Roanoke, Va.	Shenandoah	133 s	134 L
Penna.	Carnegie, Pa.	Dennison, O.	16.0 t	40 S
	Wampum, Pa.	Mosier, O.	61.6 d	40 L
	Warren, Pa.	Invineton	27.4 d	12 L
	Terre Haute, Ind.	"K" Cabin	6.4 d	14 L
S. P.	San Antonio, Tex.	Yard	1.5 d	13 S
Tex. & La.	Eureka, Tex.	Cypress	20.0 s	45 S
	Conrtney, Tex.	Navasota	8.3 s	19 S
	Withers, Tex.	Del Rio	120 s	276 S
	Osman, Tex.	Sandersen	60.7 s	140 S
	Algiers, La.	Avondale	8.0 s	18 S
U. P.	Echo, Utah	Gateway	25.8 d	112 S
	Denver, Col.	Limon	88.2 s	176 S
O. S. L.	Gibson, Idaho	Idaho Falls	34 s	28 S
L. A. & S. L.	Farrier, Nev.	Las Vegas	59 s	106 S
Virginian	Mullens, W. Va.	Matoka	22 d	50 S
Wabash	Logansport, Ind.	Peru	10.8 s	17 S
	Montpelier, O.	Adrian	25.9 s	52 S
	Bement, Ill.	Decatur	12.2 d	30 S
	Litchfield, Ill.	Mt. Olive	18 d	8 S
	Nameoki, Ill.	Granite City	5 d	10 S
W. P.	M. P. 137.17	M. P. 153.14	3.1 d	3 S
			1,247.8 s	1,456 S
			432.7 d	1,587 L

by the operator or gateman along with other duties, thereby dispensing with switchmen and making train stops unnecessary while at the same time affording protection for train movements. A typical plant of this sort was installed by the Canadian National at Brantford, Ont., involving 8 levers of desk control and 6 switch machines with 9 signals. Another plant, installed by the C. & N. W. at Dakota Junction, Neb., has proved successful in eliminating train stops without increasing the number of employees.

Although automatic interlockings have been used on a few roads for 10 years or more, the recommendation of the Signal section, A. R. A., last March to abandon the use of derails has given added impetus to the idea of pro-

TABLE D—INTERLOCKING PLANTS INSTALLED DURING 1924

Road	Location	Working levers				Road	Location	Mechanical	Electric	Electro-pneumatic	Electric movements on out-lying switches
		Mechanical	Electric	Electro-pneumatic	Electric movements on out-lying switches						
A. T. & S. F.	El Dorado, Kan.	7	10	..	5	Penn.	Huntingdon, Pa.	..	4	..	..
	Ellinor, Kan.	10	13	..	12		Huntingdon, Pa.	15	20	..	..
	Emporia, Kan.	..	..	..	1		Renovo, Pa.	..	11	..	..
	Emporia West End, Kan.	..	..	..	..		Southport, N. Y.	4	5	..	..
	Plymouth, Kan.	..	..	..	..		Northumberland, Pa.	..	16	..	..
	Fullerton, Cal.	..	12	..	..		Sunbury, Pa.	..	10	..	..
	Galesburg, Ill.	..	..	..	..		Trenton, N. J.	..	..	12	..
	Oklahoma City	..	..	..	..		Morrisville, N. J.	..	..	24	..
	Guthrie, Okla.	..	2 d	..	..		Other plants	..	28	..	..
A. C. L.	Uceta, Fla.	..	7	..	..		Loetsdale	..	9	..	..
	Tampa, Fla.	12	..	..	..		Millvale, Pa.	22	22	..	..
	Jesup, Ga.	..	2 d	..	1		Apello Jct., Pa.	13	3	..	..
	Sylvestor, Ga.	10	..	..	..		Wolf Lake, Ind.	5	8	..	..
	Selma, N. C.	..	3 d	..	..		Mansfield, O.	..	10	..	..
B. & O.	Ind. Harbor Draw, Ind.	..	144	..	..		Mansfield, O.	..	5	..	..
	Clayton, Md.	17	..	..	..	P. M.	Flint, Mich.	4	..	..	..
	Columbus Grove, O.	28	..	..	..	Reading	Camden, N. J.	..	..	57	..
	Alexandria Jct., Md.	40	..	..	1	St. L. S. F.	Turrell, Ark.	10	..	..	..
	Homer, O.	24	..	..	..	S. P.	Knapp, Cal.	..	2	..	..
	Lowellville, O.	32	..	..	..		Alazon, Nev.	..	5	..	..
	Byers Jct., O.	32	..	..	..		Weso, Nev.	..	5	..	..
S. P.	South Jct., Que.	3	..	..	..	Tex. & La.	Flaton, Tex.	1	3 d	..	2
	Bellwood, Sask.	Automatic	..	..	..		Beaumont, Tex.	4	..	..	..
	Tisdale, Sask.	Automatic	..	..	..		Bonniers Pt., Tex.	..	18	..	..
	Wadena, Sask.	13	..	..	..		Kaufman, Tex.	2	..	..	..
N.	Moncton, N. B.	13	4	..	..		Eagle Lake, Tex.	3	..	40	..
	Beaconsfield, Que.	..	1 d	..	1		Brenham, Tex.	..	..	1	..
	St. Anne, Que.	..	1 d	..	1		Dallas, Tex.	..	..	1	..
	Scarboro Jct., Ont.	..	1 d	..	1		Schriever, La.	3	..	..	..
	Brantford, Ont.	..	8 d	..	6		Cade, La.	5	..	..	..
	Lynden Jct., Ont.	..	7 d	..	5	Southern	Majolica, N. C.	4	..	..	..
	Chaudiere, Que.	3	..	..	1		Bearden, Tenn.	4	..	..	..
C. R. R. of N. J.	Tunnel, Pa.	..	4	..	3	T. & P.	Melville, Tex.	8	..	..	..
	Port Reading, N. J.	..	10	..	..		Plaquemine, La.	11	..	..	..
C. & O.	Guyandot, W. Va.	13	10	..	..		Grosse Tete, La.	8	..	..	..
	Lynchburg, Va.	..	..	10	..		Dallas, Tex.	8	..	..	..
	Russell, Ky.	..	2 d	12	..	U. P.	Borie, Wyo.	12	..	..	..
C. & A.	Normal, Ill.	2	..	..	..	O. S. L.	Reverse, Ida.	..	2 d	..	1
C. & N. W.	Freeport Line Jct., Ill.	..	34	..	..	L. A. & S. L.	Orchard, Ida.	..	2 d	..	..
	Clinton, Ia.	..	49	..	..		Provo, Utah	..	16	..	..
	Elmhurst, Ill.	16	..	..	..	Wabash	Oakwood, Mich.	..	20	..	..
	Chase, Wis.	..	5	..	..	W. P.	San Joaquin Riv.	6	..	..	..
	Chicago	..	79	..	..			774	1,300	412	59
C. & B. & O.	Aurora, Ill.	..	113	..	..				
C. M. & St. P.	St. Paul, Minn.	18	..	..	..			
	Delmar, Ill.	..	15	..	..				
C. R. I. & P.	Latimer, Kan.	12	..	..	..			
	Maple Hill, Kan.	20	2 d	..	2						
Chi. Union Sta.	Chicago Terminal, Ill.	..	..	132	..						
D. L. & W.	Lincoln Park, N. J.	..	4 d	..	2						
G. N.	Ailouez, Wis.	7	..	..	..			
	Arlington, S. D.	Automatic	..	..	..			
	Sioux Falls, S. D.	Automatic	..	..	..			
	Manley, Minn.	Automatic	..	..	..			
	Paynesville, Minn.	Automatic	..	..	..			
	Lohman, Mont.	..	1 (3p)	..	..				
	Summit, Mont.	..	1 (3p)	..	..				
I. C.	Homewood, Ill.	..	63	..	..				
	Richton, Ill.	..	78	..	..				
	Askum, Ill.	18	12	..	2						
	Gilman, Ill.	..	40	..	5						
	Clifton, Ill.	7	3 d	..	..				
	..	..	6	..	..				
I. R. T.	108th St. Yard, N. Y.	..	1 d	..	..				
	Moshulu Park, N. Y.	..	44	..	..				
I. G. N.	Palestine, Tex.	7	..	..	..			
I. & N.	Louisville, Ky.	..	3	..	..				
	Chickasawhogue, Ala.	3	2	..	..				
	Tensas River, Ala.	3	2	..	..				
	Catoma, Ala.	4	5	..	..				
	One Mile Creek, Ala.	3	3	..	..				
	Three Mile Creek, Ala.	3	2	..	..				
	Mobile River, Ala.	3	2	..	..				
	Bayou Sara, Ala.	3	2	..	..				
	A. S. Lumber Co., La.	8	..	..	..			
L. I.	Queens, N. Y.	..	10	..	..				
M. P.	Flinton, Ill.	5	..	19	..						
	East Bottoms, Mo.	20	..	..	1						
	Kaw Point, Mo.	7	..	..	3						
	Kenneth, Kan.	4	..	..	2						
M. K. T.	Carrollton, Tex.	23	2 d	..	1						
	Hilo, Tex.	..	2 d	..	1						
N. & W.	Chillicothe, O.	..	12 d	..	..				
N. P.	Minneapolis, Minn.	..	39	..	..				
N. Y. C.	Rotterdam Jct.	..	53	..	..				
	Geneva, N. Y.	47	8	..	..				
	Tonawanda, N. Y.	..	13	..	..				
	Lyons Jct., N. Y.	5	6	..	..				
	Selkirk, N. Y.	..	60	..	..				
	Selkirk, W. Hump.	..	27	..	..				
	Selkirk E. Hump.	..	21	..	..				
	Chelsea, N. Y.	..	16	..	..				
	Elyria, N. Y.	..	10	..	..				
M. C.	Hallett	1	10	..	..				
B. & A.	Niverville, N. Y.	..	42	..	..				
O. C.	Fultonham, O.	6	..	..	..			
	Columbus, O.	3	..	..	..			
N. Y. C. & St. L.	Westfield, N. Y.	8	..	..	..			
	Vermillion, O.	12	..	..	..			
	Madison, O.	8	..	..	..			
	Festoria, O.	13	9	..	..				
	Arcadia, O.	8	5	..	..				

d = desk type controller.

d = desk type controller.

viding signal protection for simple railroad crossings that do not include switches or crossovers. The Great Northern has about 25 such plants in service and installed 4 more last year. The Canadian National installed an automatic plant at Humberstone, Ont., and others are under consideration.

Interlocking Under Construction

The majority of the interlockings under construction at the close of the year comprise features of large terminals and yards. Electro-pneumatic plants involving 470 levers are under construction, the largest, involving 77 levers, being at the Chicago Union Station. Two such plants, involving 69 and 47 levers, respectively, are being installed by the Illinois Central at Markham classification yard, Chicago. Further details of the 51 interlockings reported as under construction are shown in Table E.

Good Prospects for 1925

On the 22 roads making a definite report as to signaling programs for 1925, as shown in Table C, over 1,214 miles of single track and 433 miles of double track signaling is contemplated. The Great Northern has authorized 400 miles of signals; the Santa Fe has nearly 200 miles planned and the Southern Pacific an equal amount. Authority has been granted for 631 miles of signaling on four roads not listed in Table C. Therefore, a total of 2,274 miles of signaling is in view for 1925. This amount exceeds by 612 miles of road that contemplated at this time a year ago. Considering the heavy traffic of the year just closed and the excellent prospects for 1925 it is fair to assume that these installations and numerous others included in budgets not yet approved will be carried out.

TABLE E—INTERLOCKING PLANTS UNDER CONSTRUCTION, DEC. 31, 1924

Road	Location	Working levers			
		Mechanical	Electric	Electro-pneumatic	Electric movements on out-lying switches
A. T. & S. F.	Bird Siding	6			
C. N.	Pt. Arthur	29			
C. & O.	Russell, Ky.			20	
	West Ashland, Ky.			20	
	Clyffside, Ky.			21	
	Buffalo Tunnel, Ky.		2 d		
	Covington, Va.	4	5		
	White Sulphur, W. Va.	8	2 d		
C. & N. W.	Kickapoo, Ill.		3 d		1
Chi. Union Sta.	Chicago			77	
I. C.	Markham Yd.				
	N. B. Classification			69	
	Markham Yd.				
	S. B. Classification			47	
I. R. T.	New York—240th St.			52	
	New York—149th St.			24	
	New York—164th St.			11	
	New York—148th St.			90	
L. & N.	Dolen, Ky.	4	4		
	Perritt, Ky.	4	7		
	Louisville, Ky.		48		
N. Y. C. & St. L.	Mortimer, O.	24	8		
	Latty, O.	8			
N. Y. C.	Palatine Br.	21	24		
	Stuyvesant, N. Y.	31	48		
	National Jct.	13	20		
	Schodack Jct.	9	13		
	Voorhesville		9		
	Adrian, Mich.	12			
	Oscola, Ind.	40			
M. C.	Alexis, O.	3	9		
C. C. C. & St. L.	Mix, O.	14	6		
	Morgan, O.	20			
N. & W.	Tunnel No. 1		2 d		
	Tunnel No. 4		2 d		
Penna.	Greenville, N. J.			36	
	"NS" Tower	9	8		
	Mansfield, O.		13		
	Mansfield, O.	21	4		
	Ft. Wayne, Ind.		7		
	Indiana Harbor, Ind.	67	4		
	Park Manor, Ill.	24	7		
	Burgoon, O.	8	7		
	Maple Grove, O.	24	21		
	Unionville, O.	12	5		
Reading	Port Clinton, Pa.	5			
S. P.	Flvas, Cal.		8		
Tex. & La.	Baer Jct., Houston		2 d		1
	San Antonio, Tex.		22		
T. & P.	Denton, Tex.	4			
Washington Terminal	Washington, D. C.			5	
		424	320	472	2

d = desk type controller lever.

TABLE F—INTERLOCKING PLANTS CONTEMPLATED FOR 1925

Road	Location	Working levers			
		Mechanical	Electric	Electro-pneumatic	Electric movements at out-lying switches
A. T. & S. F.	Milano, Tex.		2 d		1
	Temple, Tex.		2 d		1
	McGregor, Tex.		2 d		1
	Saginaw, Tex.		2 d		1
	Wallis, Tex.		2 d		1
	Belleville Yd.		2 d		1
	Brenham, Tex.		2 d		1
I. N.	Maccan, N. S.				1
C. & O.	Gauley, W. Va.	10	5		
	MacDougal, W. Va.	4			
	Clifton Forge, Va.	4			
	Clifton Forge, Va.		2 d	24	
	Balcony Falls		2 d		1
Chi. Union Sta.	Chicago			34	
D. L. & W.	Hoboken, N. J.			12	
	Hoboken, N. J.			24	
	Lyndhurst, N. J.			19	
	Passaic, N. J.	4			
Erie	Griffith, Ind.			34	
G. N.	Pacific Jct., Mont.	4			
	Shelby, Mont.	4			
I. R. T.	Corona			40	
	5th Ave.			7	
L. I.	Babylon, N. Y.			18	
	Bethpage, N. Y.			18	
L. & N.	Louisville, Ky.	40			
	Memphis Jct., Tenn.	18			
	Louisville, Ky.	23			
	Harbell, Ky.	4	7		
	Rigolets, La.	3	2		
	Strawberry, Ky.	21			
	Bardstown Jct., Ky.	24			
N. Y. C.	Nasby, O.		57		
C. C. C. & St. L.	Lenox, Ill.		75		
	Pana, Ill.		82		
N. Y. C. & St. L.	South Gary, Ind.		9		

Penna.	Corry "MS"	3			
	Johnsonburg "UK"	2	3		
	Johnsonburg, Pa.		4		
	Benzinger, Pa.	4	8		
	Benzinger, Pa.		4		
	Keating, Pa.		4		
	Clare, O.	14	8		
	Bradford Jct., O.	14	16		1
	Dublin	26	7		
	Altamont	35	7		
	Cincinnati, O.			27	
Reading	Birdsboro, Pa.				
S. P.					
Tex. & La.	Port Arthur, Tex.	10			
	Dallas, Tex.		37		
	Dallas, Tex.		12		
U. P.	Summit, Neb.	39			
	Omaha, Neb.	30			
	Bonner Springs, Kan.	26			
	Manhattan, Kan.	39			
Virginian			55		
Wabash	Detroit, Mich.		19		
	Bement, Ill.		29		
		405	480	257	10

d = desk type circuit controller lever.

TOTAL CONSTRUCTION, 17 YEARS, I. C. C. REPORTS

Year	Miles of road		
	Construction of automatic block	Construction of manual block	Net addition to miles of road operated by block system
1908	1,387.6	—517.6	870.0
1909	2,047.1	4,162.2	6,209.3
1910	3,473.8	2,037.3	5,511.1
1911	2,623.4	2,517.2	5,140.6
1912	1,883.9	5,656.2	7,540.1
1913	4,350.5	—1,563.4	2,787.1
1914	3,294.2	6,577.5	9,871.7
1915	1,079.0	—1,112.0	—33.0
1916	2,012.1	—179.8	1,832.3
1917	2,238.5	—1,114.7	1,123.8
1918	1,796.3	—1,430.3	366.0
1919	979.4	1,007.1	1,986.5
1920	575.1	—575.7	—0.6
1921	517.6	66.5	584.1
1922	1,004.1	—328.0	676.1
1923	1,471.5	1,282.0	2,753.5
*1924	2,356.0	157.0	2,515.0

*Our figures for 1924.

AUTOMATIC BLOCK SIGNALS

Table A—New Automatic Block Signals Completed in 1924

	Single track miles	Double track miles	Three track miles	Four track miles	Total miles road
United States	1,548	717	20	8.2	2,293
Canada	16	47	0	0	63
Total	1,564	764	20	8.2	2,356

Table B—New Automatic Block Signals Under Construction on December 31, 1924

	478	395	3.3	0	876
United States	478	395	3.3	0	876
Canada	0	6	0	0	0
Total	478	395	3.3	0	876

Table C—New Automatic Block Signals Proposed for 1925

	1,134	433	0	9	1,576
United States	1,134	433	0	9	1,576
Canada	114	0	0	0	114
Total	1,248	433	0	9	1,690

INTERLOCKING PLANTS

Table D—Interlocking Plants Completed in 1924

	Number of plants		Number of levers			Total levers	Number Remote controlled switches
	New	Rebuilt or additions	Mechanical	Electric	Electro-pneumatic		
United States	92	53	742	1,278	412	2,432	44
Canada	14	0	32	22	0	54	15
Total	106	83	774	1,300	412	2,486	59

Table E—Interlocking Plants Under Construction December 31, 1924

	43	24	395	320	470	1,185	2
United States	43	24	395	320	470	1,185	2
Canada	1	0	29	0	0	29	0
Total	44	24	424	320	470	1,214	2

Table F—Interlocking Plants Proposed for 1925

	47	21	405	425	257	1,087	9
United States	47	21	405	425	257	1,087	9
Canada	0	1	0	1	0	1	1
Total	47	22	405	426	257	1,088	10

The majority of the interlocking plants planned for 1925 are of medium size; however the total number of levers contemplated shows a slight increase over that planned a year ago. The interlocking plants planned (Continued on page 112)



A Well Constructed Open Wire Lead

Telegraph and Telephone Progress

Less construction in 1924 than in 1923—Indications point to more extensive work this year

By R. S. Kenrick

NEW copper telephone circuits for train dispatching and conversational purposes were the major construction items in railroad telegraph and telephone construction during 1924. Another feature was the extension of long distance telephone circuits for handling railway business on company wires. Heavy maintenance work, such as the reconstruction of existing pole lines to conform to modern standards, occupied the principal attention of some roads; the majority, however, carried out normal maintenance programs. To increase the capacity of existing wires, phantom telephone circuits, simplex and composited telegraph circuits, telephone repeaters, and telegraph printers were installed. This, our fifth annual review of activities in the railway communication field, was compiled from data furnished by 127 leading railroads of the United States and Canada.

New Facilities Installed in 1924

As shown in the table, 39 of the 127 roads reporting completed new construction work during 1924. The installation of 11,732 miles of new copper telephone wire is the outstanding feature of the past year. Additional telegraph facilities were provided by the installation of 3,019.4 miles of copper wire and 1,432.94 miles of iron wire during the same period. A total of 14,751.5 miles of copper wire and 1,860.44 miles of iron wire is reported as having been placed in service for all uses during 1924. The largest wire installation reported during the year was 1,786.14 miles of copper telephone wire on the Southern, while the Canadian Pacific installed 1,549 miles and the Louisville & Nashville 1,119 miles of similar wire during the same period. The Canadian Pacific placed in service 1,045 miles of new iron telegraph wire and 980 miles of new copper wire for telegraph purposes, which, according to the figures received, was the largest telegraph installation of the year.

During the year, 706.46 miles of new pole line was built by the railroads, while 76.7 miles of new line was constructed jointly with the telegraph companies and 50.76 miles of line was completed by the telegraph com-

panies for railroad purposes. This mileage is exclusive of a large amount of reconstruction of outside plant facilities, which was carried out by the railroads and telegraph companies in replacing old pole lines wherever unsafe conditions made it necessary. Telephone train dispatching circuits were installed on 2,134.39 miles of road in 1924, while telegraph dispatching circuits were installed on 82.7 miles of road. These figures are smaller than the corresponding figures for 1923 when telephone dispatching circuits were installed on 2,931.7 miles of road (a decrease of 797.31 miles), while the amount of new line built for telegraph dispatching showed a decrease of 552.9 miles. The largest telephone train dispatching installation reported during the year was 421.74 miles of road on the Southern, while the N. Y. N. H. & H. completed 261.58 miles and the Reading placed in service 245.77 miles of telephone dispatching facilities.

Long Distance Message Circuits

Long distance message or conversational circuits were installed during the past year to the extent of 2,905.5 miles, a decrease of 2,963.5 miles under the 1923 figures. In spite of the limited installation, the opinion is general that the need for such circuits is increasing each year. The Canadian Pacific reported the completion of 832 miles of these circuits and the Louisville & Nashville 559.6 miles. To increase the message capacity of their communication circuits, the railroads have installed special superimposed circuits to permit simultaneous use of limited wire facilities. During the past year, 2,313.64 miles of phantom telephone circuits were put in service, 2,789.96 miles of telegraph circuits were obtained by simplex and 249.1 miles of telegraph circuits were obtained by compositing. The Canadian Pacific installed 684 miles of duplex telegraph apparatus, while the Wabash and the Santa Fe report the completion of 113 miles and 60 miles of telegraph circuit respectively, operated quadruplex.

It appears that the railroads, generally, were able to complete most of the telegraph and telephone construc-

tion which was scheduled for 1924, as evidenced by the small amount of such work listed as under construction on December 31, 1924. The installation of 147 miles of copper telephone wire on the Chesapeake & Ohio, 77.2 miles of similar wire on the Reading, and 62 miles of phantom telephone on the Santa Fe, are the chief projects now under construction.

New Work Contemplated for 1925

Although budget estimates for 1925 are not yet completed on a majority of the roads reporting, it is of interest to note that 31 roads have some construction work

contemplated for 1925. The leading item of importance is the proposed installation of 12,884.18 miles of copper telephone wire, as compared with 1,175 miles of copper wire for telegraph purposes. The Missouri Pacific reports that 4,301 miles of new telephone wire is under consideration. Eight roads are planning for telephone train dispatching on 2,157.2 miles of road, while no road contemplates any telegraph train dispatching installations.

Eleven roads plan to install 3,344 miles of long distance message or conversational telephone circuits; the largest being that contemplated by the Missouri Pacific, which intends to place 1,082 miles of such circuits in

Telegraph and Telephone Construction Statistics

	Miles of pole line			Total miles wire owned exclusively by R. R.				Miles dispatched by telephone	Miles of long distance message circuits	Miles of phantom telephone	Miles of simplex telegraph circuits	Miles of composite telegraph circuits	
	Road	Owned by railroad	Owned by commercial company	Owned jointly	Telegraph		Telephone						
					Iron	Copper	Iron						Copper
Completed during 1924	A. T. & S. F.			49.	150.	195.	124.	130.			183.		
	A. C. L.						440.						
	C. P.—East. Lines.	501.			1,045.	980.	1,549.		832.		825.		
	C. of Ga.						28.4			95.8			
	C. R. R. of N. J.	.6								30.			
	C. & O.					875.		36.			256.		
	C. & A.			11.7									
	D. L. & W.			14.6						31.11	109.	283.	
	D. & I. R.	7.5										116.	
	G. N.										60.		
	Gulf C. L.												
	Gulf M. & N.				108.8		88.	496.	193.1				
	L. V.						32.6	385.89	178.22				
	L. & N.							1,119.	8.3	559.6	584.	88.4	
	M. K. T.							198.		99.	99.		
	M. P.							292.62	196.78				
	N. Y. N. H. & H.			6.				523.36	261.58				
	N. Y. O. & W.					346.2		36.04					
	N. & W.	134.						132.		35.			
	N. Y. C.—East.	2.			31.	14.	391.	328.		158.	408.	493.	
	West										131.		
	C. J. Ry.							.93					
	C. C. C. & St. L.							143.				71.6	
	E. I. & T. H.							278.86	129.				
	I. H. B.							98.					
	M. C.							622.78		311.39			
	N. P.	31.						234.	31.	162.	8.		
	Penn.					154.64		1,194.98		240.	55.	264.	
	Rutland								156.7		67.4		
	Reading							370.8	245.77			144.5	
	Southern	.2						1,786.14	421.74		441.74	171.56	
	S. P.—La.							95.5					
	Tex.							320.5		320.5	320.5		
	T. & P.					73.04							
	U. P.			16.			8.1	69.68		61.1		9.9	
O. S. L.		30.16			24.1		40.8						
O. W. R. R. & N.	30.16						182.2	182.2					
L. A. & S. L.					334.		634.						
W. P.											133.1		
Totals	710.56	60.76	77.55	1,580.94	3,019.44	427.5	11,732.08	2,137.61	2,905.5	2,313.64	2,789.96	249.1	
Under constr'n Dec. 31, 1924	A. T. & S. F.									62.			
	C. & O.						147.			19.5			
	Erie												
	N. & W.	28.									38.21		
	Reading						77.2	38.21					
	U. P.—O. S. L.			27.78			55.56						
Totals	28.		27.78				297.76	38.21		81.5	38.21		
Contemplated for 1925	A. T. & S. F.				170.		562.	281.			663.		
	C. & O.					55.	732.	124.			824.		
	C. R. I. & P.					283.							
	D. L. & W.			31.5									
	Erie									19.5			
	Hocking						252.						
	G. N.						308.		154.	281.	281.		
	I. G. N.						518.						
	M. P.					720.	4,301.	989.	1,082.	295.	223.	710.	
	N. & W.	133.											
	N. Y. C.—East.						55.	1,018.		509.	1,073.		
	West									350.			
	B. & A.									50.			
	C. C. C. & St. L.									125.	125.	250.	
	I. H. B.										11.		
	M. C.							156.84		78.42			
	O. C. I.							130.		65.	65.		
	P. & F.									211.	211.	422.	
	P. & L. E.							129.8					
	N. Y. N. H. & H.						1,273.54	385.6	251.2	209.5			
	N. P.						33.						
	Penn.					117.1		937.4	71.0	455.0	262.3	358.0	
	Rutland						36.9	450.	120.5				
	Reading							112.6		58.8		58.8	
	U. P.				18.4			605.8				827.8	
	U. P.—O. S. L.			94.27									
	O. W. R. R. & N.				42.1			814.1		814.1			
	L. A. & S. L.							118.					
Wabash							280.	140.					
Wash. Term.							106.						
W. M.							46.1	46.1					
Totals	140.5	31.5	94.27	230.5	1,175.1	91.9	12,884.18	2,157.2	3,344.	2,388.3	4,314.8	1,440.8	

service during this year. Twelve roads intend to complete 2,388.3 miles of phantom telephone circuits during 1925. Increased telegraph circuit facilities obtained by simplexing are planned by eight roads, which will add 4,314.8 miles of telegraph circuit this year. The New York Central plans the largest installation of this nature and will add 1,073 miles of telegraph circuit in this manner. A similar installation of 827.8 miles of circuit is planned by the Union Pacific during 1925. To increase its telegraph facilities, the Missouri Pacific plans to put 710 miles of composited telegraph circuits in service this year. A limited amount of new railroad-owned pole line is contemplated for 1925; the Norfolk & Western intends to build 133 miles.

The Oregon Short Line plans to install 498.44 miles of multiplex printing telegraph circuit this year, while the Oregon-Washington plans to use the single automatic printer on 398.9 miles of circuit.

Telegraph Officers Stress Importance of Adequate Communication Service

Much valuable work in the dissemination of technical information regarding telegraph and telephone developments, construction methods, as well as the issuing of instructions for the proper maintenance of telegraph facilities has been accomplished by the members of the Telegraph & Telephone section of the A. R. A. during the past year. Through its various committees, many studies have been made in an effort to speed up the handling of traffic and to increase the message capacity of existing plants through the installation of improved equipment. Attention has also been given to the importance of providing technical training for telegraph and telephone employees and indications point to a greater interest in this direction in the future.

As a result of a questionnaire sent out by the *Railway Age*, letters were received from 55 superintendents of telegraph, giving information on new line and wire construction, rebuilding of facilities, maintenance, recent installations of improved equipment and the probable trend of future developments in the railway telegraph and telephone field. The replies show that 32 telegraph superintendents believe that a total of 34,000 miles of new wire should be installed on their roads during 1925 to handle the traffic expected. Five roads report that 2,500 miles of pole line ought to be rebuilt, while two roads say that 375 miles of new pole line will be needed this year. Present pole and wire facilities are considered adequate on 10 roads. One of the largest systems in the country states that 9,000 miles of new wire should be installed during the year.

An increased construction program during the year is contemplated by 12 roads in view of an anticipated increase in the volume of traffic to be handled in 1925. Of the roads reporting, 18 are of the opinion that pole line and wire maintenance must be given preference this year, while 15 say that the installation of new telephone wire for train dispatching and message circuits, including long distance lines, is of prime importance at this time. The indications are favorable for the approval of telegraph and telephone budgets on 35 roads, while four roads indicate little hope in this direction due to financial difficulties on their properties. However, one of the large north-western roads reports that its 1925 budget has already been approved and part of the program is under construction. Of the roads mentioning the status of maintenance of their outside plant facilities, 31 say that their maintenance is up to date, six estimate that they are one year behind, three state that their program is three years in arrears, while three more report that they are between four and five years behind in this respect. The roads with

deferred maintenance programs, with a few exceptions, are looking forward to an extensive maintenance program this year to improve the condition of their communication facilities, but those roads which have been able to keep their maintenance up to date, are anticipating only a normal maintenance program this year.

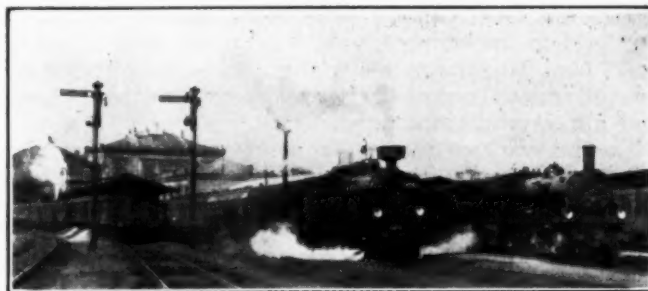
Telephones, Automatic Printers, Carrier

Currents, and Radio Developments Expected

Five roads reported the extension of telephone train dispatching circuits on their lines during the past year as a means of increasing the capacity of their communication plant, and five roads installed message and long distance telephone service for a similar purpose. To expedite the handling of business on heavy traffic districts, eight roads, including two Canadian systems, installed some form of automatic printing telegraph on their lines. Results reported by those roads that have installed automatic printers under favorable traffic conditions indicate that the expense involved was more than offset by the large economies effected through their use.

Automatic printing telegraph circuits, single type, were installed to the extent of 171.55 miles on the Oregon Short Line during 1924, and three roads reported the installation of a total of 2,397 miles of multiplex printing telegraph for heavy traffic service. The largest installation of the multiplex printer was reported by the Union Pacific which completed 1,482 miles of such circuits. A multiplex printer circuit was installed between Los Angeles and Salt Lake on that unit of the Union Pacific System and the Canadian Pacific installed a double-duplex printer circuit from Montreal to Winnipeg, also three similar circuits between other important centers.

As to the probable future developments in the railway communication field in the next few years, the replies show that 18 superintendents of telegraph believe that, owing to the increasing scarcity of competent Morse operators, and increasing costs of Morse operation, some type of machine telegraph will have to be installed. That the popular interest in radio will hasten its development into a practical agency in the operation of trains, as well as for the entertainment of passengers, in the not too far distant future, is the opinion expressed by 18 telegraph officers. Radio service has been found valuable in emergencies, particularly during times of wire failure. The extension of carrier current systems for both telegraphy and telephony to the railroad field, will be one of the future developments to increase the capacity of heavily loaded wires, provided the cost of this type of equipment can be materially lowered, according to replies received from 11 roads. Other telegraph officers predict a further extension of telephone service for train dispatching and message service, including long distance conversational circuits, as a future development of prime importance. It is generally recognized that modern communication facilities are becoming more indispensable each year as a necessary adjunct to a busy railroad system.



Dividend Changes on Stocks in 1924

MOST of the changes made in dividend rates on railway stocks during 1924 were increases. The feature of the year was the number of carriers that declared initial dividends on their common or preferred issues. Such issues receiving initial dividends included Louisville, Henderson & St. Louis preferred, Missouri-Kansas-Texas preferred, St. Louis-San Francisco preferred and common, Southern common and Texas & Pacific preferred. A tabulation of the important dividend changes of the year follows:

Alabama Great Southern. In 1922 and 1923, this company paid 7 per cent dividends on its preference and ordinary issues. In May, 1924, in addition to the regular $3\frac{1}{2}$ per cent semi-annual dividends an extra $\frac{1}{2}$ per cent dividend was declared on both issues, payable June 28. Regular dividends were declared in November.

Atlanta & West Point. The dividend rate has been 6 per cent since 1884, and dividends have been paid regularly since 1855, except for the single year 1866. In April, the directors declared a semi-annual dividend of $3\frac{1}{2}$ per cent in place of the usual 3.

Atlantic Coast Line. This company's stock has received 7 per cent dividends, this rate dating from 1917. In May, an extra of 1 per cent was declared payable July 10 in addition to the regular $3\frac{1}{2}$ per cent semi-annual payment. Regular dividends were declared in November.

Buffalo & Susquehanna R. R. Corp. In 1922 and 1923, 17 per cent was paid, including 7 regular and 10 extra. Dividends were at this rate for March 31, 1924, namely, $1\frac{3}{4}$ regular and $2\frac{1}{2}$ per cent extra for the quarter. In June, the directors declared the regular quarterly dividend but omitted the extra. In December, the regular quarterly dividend was declared and a semi-annual extra dividend of 2 per cent both payable December 30.

Chicago & North Western. In December, 1923, the directors reduced the semi-annual dividend on the common from $2\frac{1}{2}$ to $1\frac{1}{4}$ per cent. In June, the rate was raised to 2 per cent, making the annual payments now 4 per cent.

Chicago, Indianapolis & Louisville. Since 1920, Monon common has received quarterly dividends of $1\frac{3}{4}$ per cent, making an annual rate of $6\frac{1}{2}$ per cent. In June, the quarterly rate was increased to 2 per cent.

Chicago, St. Paul, Minneapolis & Omaha. Directors in June deferred the regular $3\frac{1}{2}$ per cent semi-annual dividend on the preferred. In November, however, 5 per cent was declared payable December 31, making payments for the year $8\frac{1}{2}$ per cent.

Cleveland, Cincinnati, Chicago & St. Louis. In March, the quarterly rate of 1 per cent on the common paid since January, 1923, was raised to $1\frac{1}{4}$ per cent.

Georgia R. R. & Banking Co. This company owns the Georgia Railroad, which it leases to the Atlantic Coast Line and the Louisville & Nashville. Dividends of 12 per cent had been paid annually since 1911 until May when the quarterly rate was reduced from 3 to $2\frac{1}{2}$ per cent.

Gulf, Mobile & Northern. Preferred stock is entitled to dividends of 6 per cent cumulative since January 1, 1920. Initial dividend of 1 per cent paid November 15, 1923; 1 per cent paid February 15, 1924, and $1\frac{1}{4}$ per cent in May, August and November. In December the directors raised the quarterly rate to $1\frac{1}{2}$ per cent payable February 15, 1924. Preferred dividends are now in arrears in the amount of $24\frac{1}{4}$ per cent.

Louisville & Nashville. The $2\frac{1}{2}$ per cent semi-annual dividend paid since the $62\frac{1}{2}$ per cent stock dividend was declared in May, 1923, was increased to 3 per cent in May.

Louisville, Henderson & St. Louis. Initial dividend of 4 per cent was declared on the non-cumulative preferred in January, payable February 15.

Maine Central. Payments were resumed on the 5 per cent cumulative preferred with a quarterly dividend of $1\frac{1}{4}$ per cent payable December 1. This was the first payment since September 1, 1920, and there are now accrued dividends amounting to \$20.

Missouri-Kansas-Texas. On December 15, directors declared an initial dividend of \$1.25 on the preferred A stock, payable February 2.

New Orleans, Texas & Mexico. In May, an extra of $16\frac{1}{2}$ per cent was declared, $4\frac{1}{2}$ per cent in cash, and 6 per cent in warrants due September 1, 1924, and 6 per cent in warrants due December 1, 1924. Regular dividends are 7 per cent.

St. Louis-San Francisco. Remarkable improvement in earnings of this property enabled the directors in October to declare an initial dividend of $1\frac{1}{2}$ per cent on the 6 per cent non-cumulative preferred payable November 1, and in December, to declare an initial dividend of $1\frac{1}{4}$ per cent, payable January 15, 1925, on the common.

Southern. In March, the directors declared the first dividend ever paid on the common stock of this company since its organization in 1894. The dividend was $1\frac{1}{4}$ per cent quarterly, payable May 1.

Texas & Pacific. Directors on December 23 instituted dividends on the preferred stock of the newly reorganized company at a rate of 5 per cent. The dividend was intended to cover the period from May 26, the date of issue of the stock under the reorganization plan, to the end of the year and amounted to \$2.91. It was payable December 31.

Vicksburg, Shreveport & Pacific. Dividends of $2\frac{1}{2}$ per cent were paid on the common in 1918, 1919, and 1920, and in 1923. In April, 1924 a dividend of 4 per cent was declared, payable April 16.

Signal Construction

(Continued from page 108)

for 1925 are listed in Table F. Some of the plants are to be rebuilt, but only the levers to be added are given in the table. Eleven of the new plants are to be electro-mechanical, 9 are electric and 7 are electric-pneumatic. Nine desk circuit controller plants are planned, involving 13 remote control low-voltage switch machines. The Great Northern is preparing estimates for several more automatic interlockings and at least a dozen other roads are investigating the economics of such installations.

Several roads not listed in the table as ready to make definite reports are known to be planning at least 20 other interlockings, including 4 hump yard plants with over 150 levers and two large electric plants with 250 levers. Several remote control layouts and four automatic plants have also been decided upon.

The majority of the larger plants proposed comprise important features of large terminal or yard improvements and must be installed to realize the full benefit of the major investments. The combining of two or more plants by the use of additional electric units and the remote

control equipment have demonstrated economies which should lead to their more extended application in the future.

General Outlook in Signaling Field

Nearly all of the multiple track lines in the United States are now equipped with automatic signals, although only 21,068 of the 200,000 miles of single track lines are so equipped. The majority of the larger installations of new signaling in the future will therefore be on single track where the delays and difficulties which now attend the movements of trains on many divisions in recurring periods of heavy traffic point to the opportunities of signal installations as a means of increasing track capacity by permitting the closer spacing of trains. The operation of trains by signal indication, obviating written train orders and train superiority rights, also eliminates numerous delays and decreases the possibility of collisions. Such a system of controlled manual, automatic signaling is in service on 25 miles of single track on the Missouri Pacific and the installation on 125 miles is contemplated.

The developments of signaling for the next few years will be in the direction of more intensive development of existing facilities by measures that will prevent train stops and increase track capacity.

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100 Years of British Railways

Centennial celebration in connection with international congress in June

By W. H. Fraser

Publicity Agent, Great Western Railway



George Stephenson's "Locomotion"

THE approach of the centenary of British railways has overshadowed the events of the past year, and the customary annual review of British railway progress is set aside for the more important consideration of the events following the introduction of rail transport one hundred years ago.

To the north of England belongs the honor of producing between Stockton and Darlington the first "public" steam railway in the world, and to commemorate the event an exhibition to illustrate the progress of rail transport over a period of one hundred years is to be held at Darlington in 1925. In the same year the International Railway Congress will hold its meeting in London from June 22 to July 4; before the Congress closes special trains will convey delegates from London to take part in the celebration at Darlington on the actual ground where the first railway was opened. Special committees of railway directors and officers are engaged in preparing for the reception of the delegates who are coming from all parts of the world, not only to attend the Congress but to take part in the celebration.

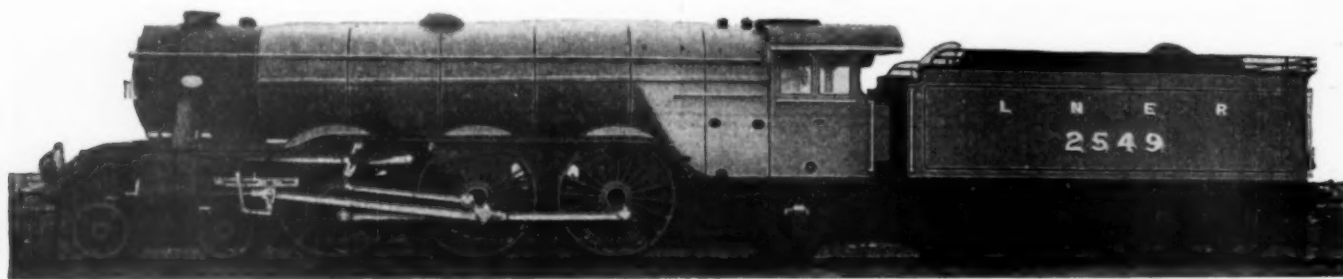
No industry has ever brought greater prosperity to Great Britain than the railway, and the celebrations will

demonstrate that railways are still supreme in the field of transport.

Early British Railways

Railways can be said to have existed in Great Britain, although not for public use, for over two hundred years, if the old timber and stone-ways that were constructed on roads leading from collieries are to be regarded as the pioneers of the modern railroad. The custom was to lay parallel timbers, upon which the wheels of the wagons ran, while the horses that hauled the wagons traveled upon the rougher road surface between. Owing to the rapid deterioration of these timber tracks the idea was conceived of fixing metal plates on them. These "plate-ways" may be said to have been the real genesis of the steel track as it is today.

The Stockton & Darlington Railway was opened on September 27, 1825; and now forms part of the London & North Eastern Company's system. Its first engine, George Stephenson's "Locomotion No. 1," weighing 7 tons, has been preserved and stood side by side with the finest examples of modern British locomotive engineering at the great Wembley Exhibition. On the day the Stock-



A Modern British Passenger Locomotive

ton & Darlington Railway was opened "Locomotion" pulled six cars of coal, one passenger car, twenty-one trucks fitted with seats and six other loaded coal cars. The speed was sufficiently low (four to six miles an hour) to enable a man on horseback to precede the train to clear the way. At the Darlington celebration it is proposed to drive "Locomotion No. 1" under its own steam over the same route traversed in 1825.

The promoters of the Stockton & Darlington did not expect to cater for a substantial passenger business, nor did they make any special provision for it, for it was unlikely that the public would patronize a form of conveyance that was no more speedy than the stage coach. The primary object was to find a better outlet for coal from the South Durham coalfield; to allow proprietors of stage coaches or other vehicles to use the line for the conveyance of passengers under certain specified conditions; and on similar terms to allow carriers to make use of the line for the transport of goods, both these phases of enterprise being carried on independently of the railway company. After the Stockton & Darlington line had been opened two weeks, the company provided a coach of its own for passenger traffic. The handbill announcing the times of departure and arrival of this service is the first known railway passenger time table. Even then the railway management did not seem anxious to retain the passenger business in its own hands, for it leased the railway company's coach to a contractor who operated it on the railway. Up to 1833 anyone was at liberty to place a vehicle upon the railway, provided he complied with the company's by-laws. These vehicles were drawn by horses and were apparently becoming something of a nuisance, as the railway company decided in 1833 that instead of having so many different carrying interests it would be desirable to take over the whole business, displacing horses by steam power. On April 7, 1834, the company commenced to run a service by locomotives for the accommodation of passengers and freight between Stockton and Middlesborough.

Opposition to the Railways

From this time onward the ultimate success of the railway was assured, not, however, without enormous opposition. The greed of rapacious landlords forced up the price of land to an extent unprecedented. The value of the land on which the old London & Birmingham Railway was constructed was estimated at £250,000, but cost the company three times that amount. Every conceivable kind of claim for damage to property was presented, although its value, through the advent of the railway, in-

creased enormously. Extortion and blackmail were rampant. The stupid ignorance and opposition of municipalities involved the companies in heavy legal expenses and unnecessary deviations of routes. The arguments advanced against the construction of railways were legion. They were generally regarded as nuisances to be suppressed at all costs.

An interesting example was the attitude of the citizens of the Royal Borough of Windsor to the Great Western Company's scheme for the promotion of a railway, and they were successful in getting a clause inserted in the Railway Act forbidding the construction of any station at that important town. Oxford University and Eton Col-



Beginning the Change from Broad to Standard Gage, Great Western, 1869

lege both entered very strong protests against contamination by the railway. The latter institution refused to allow the railway to come within three miles of the school and the college authorities obtained the insertion of a clause in the act forbidding the erection of a station at Slough, the nearest point on the main line, and requiring the company to provide policemen to patrol the line for a certain distance on each side of the town to safeguard the Eton boys from danger. All this opposition involved the companies in heavy expenses. How greatly they were handicapped financially by constructional costs is shown in Table 1 prepared for the International Railway Congress in 1911.



Approach to Garston Docks

TABLE 1.—CONSTRUCTION COST OF THE RAILWAYS OF DIFFERENT COUNTRIES.

Country	Miles	Construction Total £	Capital per mile £
Great Britain and Ireland.....	22,843	1,272,600,000	55,712
Germany	35,639	813,300,000	22,821
France	24,701	706,700,000	28,611
Belgium	2,523	93,600,000	37,088
Netherlands	1,653	28,700,000	17,350
Denmark	1,218	13,250,000	10,884
United States	233,632	3,521,200,000	15,071
Canada	22,447	269,850,000	12,022

There is little doubt that the railway in Great Britain owes its existence more to the attitude of the canal companies than to any other influence. The navigation com-



Station Tree at Moreton, Hereford

panies practically enjoyed a monopoly and the public was compelled to pay extortionate charges. Secure in the knowledge that they had not to meet competition, the rates for carriage levied on canals constituted such a burden that it became clear to traders that other methods of conveyance were essential if development was not to be stifled; and so railway projects gradually increased and

they could do for a fee of five shillings—for thousands of pounds' worth of shares; in fact, there was scarcely a family in England not directly or indirectly interested in the railway mania, and that was not afterwards involved in the unparalleled financial crisis which was the inevitable result of such mad speculation. Calls for the paying up of shares found thousands of people totally unprepared to meet the obligations they had so lightly entered into, and families were ruined wholesale.

TABLE 3.

		(Excluding Ireland)			
		Aggregate wages bill (all grades) £	Percentage increase to 1913	Average weekly earnings (all grades) s. d.	Passenger fares. Percentage increase to 1913
Year					Freight rate. Percentage increase to 1913
1913	47,000,000	...	...	30. 7.	...
1920	145,000,000	208%	...	76. 7.	50 to 75%
1921	172,000,000	266%	...	89. 11.	75%
1923	117,000,000	149%	...	66. 1.	50%

*There were very many variations in freight rates between 1920 and 1923. Roughly speaking, the maximum increase was to 100 per cent in 1921, decreasing to 50 per cent in August, 1923.

TABLE 4.

Country	Date of opening of first railway	Miles of railway completed				
		1840	1860	1880	1899	1921
British Isles	1825	1,857	10,433	17,933	21,666	24,397
United States ...	1827	2,819	30,626	93,296	189,295	265,033
Canada	1836	16	2,065	7,194	17,250	39,773
France	1828	...	5,700	16,275	26,229	33,282
Germany	1835	341	6,979	20,693	31,386	36,132
Italy	1839	13	1,117	5,340	9,770	13,506

Early Amalgamations

The history of British railways has been described as a history of amalgamations. Up to and including the year 1843 there had been considerable amalgamation of railways, but what had been accomplished was trifling to what took place after the cessation of the mania in 1846. Profiting by the experiences of the panic, the railway companies already established at that time took steps to swallow up the companies that were invading their territory; they did so as a matter of necessity to protect their own interests, and by 1850, despite the established policy of the state, directed to the maintenance of railway competition, and in spite of the opposition from Parliamentary com-

TABLE 2.—GROWTH OF BRITISH RAILWAYS, INCLUDING IRELAND, MILEAGE, RECEIPTS, ETC.

Year	Length of line open for traffic Miles	Total number of passengers carried (exclusive of season ticket holders)	Weight of goods and minerals conveyed Tons	Total of capital paid up £	Gross receipts £	Operating expenses £	Net receipts £
1840	1,857	...	...	...	...	...	...
1860	10,433	163,435,678	89,857,719	348,130,127	27,766,622	13,187,368	14,579,254
1880	17,933	603,885,025	235,305,629	728,316,848	65,491,625	33,601,124	31,890,501
1900	21,855	1,142,276,686	424,929,513	1,176,001,890	104,801,858	64,743,520	40,058,338
1913	23,718	1,454,760,813	568,201,003	1,334,011,000	139,253,000	87,242,000	52,011,000
1920	23,734	1,604,491,648	323,971,117	1,327,486,097	†310,502,844	261,754,581	53,011,341

*Figures for 1840 not available. †Including the estimated amount received by the companies, under agreement with the government, by reason of government control.

inland waterways declined. Today the importance of canals as a means of transportation, except in a few instances, is negligible.

Development was slow until 1843. In that year 24 railway acts were passed by Parliament. In the session of 1844 the number increased to 37, while in 1845 no fewer than 248 railway bills were deposited. There followed the railway mania of 1845-6, and the country went railway mad. In the session of 1846 bills were deposited for the construction of 815 new lines of railway, totaling 20,687 miles, with capital powers to the extent of £350,000,000. Powers were actually conceded to the extent of 4,790 miles (including 60 miles of tunnel) at a cost of about £120,000,000. Every class of society joined in a wild scramble for shares. People in the most humble spheres of life, some even in receipt of parish poor relief, put down their names on the subscription lists—which

mittees, they had, by amalgamation or operating agreements, created a strong foundation for the great companies that subsequently came into existence. From 1850 onwards amalgamation proceeded steadily. In 1881 there were 351 railway companies in existence. By 1906 as many as 123 of these had disappeared. The majority of the absorbed lines were short railways, financially unsound and of little importance. They were designed to give to small towns and rural districts that connection with the railway system of the country which their great neighbors had not seen their way to provide.

Under the Railways Act of 1921 the whole of the railways with the exception of a few light railways and those below the standard gage, were amalgamated into four large groups.*

A matter that caused considerable inconvenience during

*See *Railway Age* of January 5, 1924.

the early development of British railways was the difference in gage. The great engineer Brunel had constructed the Great Western to a width of seven feet, while the rails of other railways were only 4 feet 8½ inches apart. This diversity of gage was, of course, a serious barrier to the interchange of traffic, and, as the result of unanimous agreement, the Gage Act was passed in 1846, which provided that all future railways, with the exception of branches of the Great Western, should be constructed to a gage of 4 feet 8½ inches. The latter company had been gradually making the change to standard gage since 1858, until the only lines remaining broad gage were those running through the counties of Devon and Cornwall, but it was not until 1892 that they carried out a complete conversion of the remainder of their system. This was one of the most remarkable feats of British railway engineering, inasmuch as 420 miles of line were converted between May 20 and 22, 1892, thousands of the company's own workmen drawn from all parts of their system being employed. Traffic was entirely stopped and all the locomotives and cars had to be stored away from the scene of operations.

The Railway Clearing House

One of the most notable developments in the history of the railways of Great Britain was the creation of the Railway Clearing House in 1842. Enormous expense and inconvenience was being incurred on account of the transshipment of traffic, due to the fact that the rolling stock of one company did not generally pass on to the lines of another company. The developments that were at this time taking place made it incumbent upon the companies to come to some understanding in regard to the sending of traffic over one another's lines. An association with offices in London was formed from among the chief railway companies, to regulate questions of interchange of traffic and to adjust the accounts arising out of the united action of the companies. It was the business of this association to settle disputes as to the division of, and to apportion receipts from, the traffic that might pass over more than one company's line, under agreements arrived



Queen's Road Wharf and Passenger Station, Nottingham

at by the several companies; and to keep the records of the movements of cars carrying such traffic. The Railway Clearing House was at first a voluntary institution, but in 1850 it was incorporated by act of Parliament and is now a very important feature in preserving amicable relations among the various railways.

Later Developments

From 1850 onwards, development followed a more or less normal course. The battle of the railways had been fought and won, and it remained but to consolidate the position by effecting those extensions and improvements

that might be expected to result from the establishment of an enterprise of such magnitude.

A few of the most important events occurring during this period of railway history may be mentioned. The year 1850 marked the completion of the Great Northern main line and enabled through services to Scotland to be introduced. In 1863 gas lighting was first introduced in trains. This method of illumination is being rapidly replaced by electricity. The Midland Railway Company, whose disappearance as a separate entity is deplored by the public, introduced third-class compartments on all trains in 1872. The same company was the first to use



London, Midland & Scottish Freight Station, Nottingham

Pullman cars in England, and to introduce excursion trains. Corridor, restaurant and sleeping car trains were introduced generally in 1890. In 1900 experiments were first made with an electric train on the Metropolitan & District Railways of London. Auto-cars introduced in 1903 operating on branch lines in sparsely populated districts have proved a great boon and their success was instantaneous.

Britain Proud of Speed of Its Passenger Trains

Speed of trains has always been a notable feature of British railway operation. In 1904 the Great Western broke all records in a non-stop run from Plymouth to London with Transatlantic mails, when the distance of 246½ miles was covered in 3 hours 46 minutes 28 seconds, and a maximum speed of 102.3 miles per hour was attained.

The next ten years saw the introduction of countless improvements for the public benefit, including many cross-country through services over the lines of more than one company, but all development was immediately arrested by the World War.

British Railways and the Great War

Upon the outbreak of the Great War in 1914 the government, exercising the powers created by act of Parliament in 1871, at once took over practically the whole of the railways of Great Britain and retained control of them until August, 1921. The Railway Executive Committee, consisting of twelve general managers drawn from the principal railway companies in Great Britain and constituted in 1912, was the body appointed by the government to exercise general administration over the railways. In January, 1917, this control was extended to the Irish railways, and a special Irish Railway Executive Committee was formed, with headquarters in Dublin.

The importance of the part played by railways in the war will be appreciated when it is stated that no fewer than 30,000 cars, 700 locomotives and 75 ambulance and leave trains were sent overseas to France and other allied countries. Railway workshops all over the country were

turned into arsenals for the construction of war material of every description; 30,000 stretchers were manufactured and supplied to the War Office; hundreds of special cars were built with a full supply of spare parts; 2,500 sectionmen's trolleys; a number of high power and electric gantry cranes for use on lines of communication. In addition, railway workshops were designed and constructed at various points in France and to a great extent equipped with machinery stripped from the locomotive shops of the British railways.

The difficulties of the railways were enhanced by the companies having released 184,475 trained men for the various army units, in addition to principal officers and men of all grades, numbering over 2,000, loaned to the government for special duties.

After the signing of the armistice the strain on the railways became even greater. Demobilized service men and munition workers had to be taken home; repatriated prisoners-of-war dealt with; and Belgian refugees conveyed back to Belgium. Then came the Christmas leave of the forces and the ordinary Christmas traffic to further complicate the situation. For their work the companies and their staffs received striking tributes from Parliament and the press.

Railway Finance

An interesting feature of British railway finance is the number of shareholders with small holdings. Critics of the railway system have frequently placed railway shareholders in the "capitalist" category. As a matter of fact there is no other industry in the country in which the interests are more widely spread. Table 5 gives the percentage of holdings of £500 or under in the leading railways of the United Kingdom:

	Total number of holdings	Holdings of £500 and under	Percentage to total number
Ordinary Stock	418,636	260,515	62%
Preference Stocks	408,755	223,701	54%
Debenture Stock and Loans	219,886	100,103	45%

The bulk of the larger holdings is in the hands, not of financial houses and big capitalists, but of insurance com-

panies, mutual benefit societies, trade unions and other organizations handling the savings of persons of small incomes.

The Outlook for British Railways

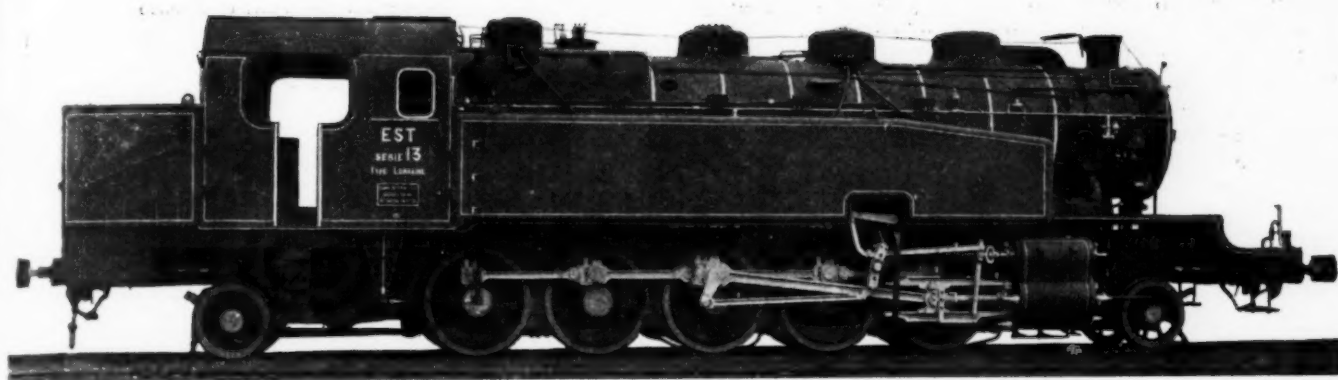
Highway transport enthusiasts of five years ago confidently believed that the advent of the internal combustion engine had sounded the death knell of the railways. They pictured grass-grown-rail tracks and moss-covered platforms, tenanted by a few ancient porters, idly listening to the increasing roar of traffic on the roads. Happily these prophecies have proved false, but railwaymen are alive to the fact that the highway is a keen competitor of the railway, and that competition between railway companies must give place to whole-hearted co-operation in providing new methods to meet new conditions. In long distance traffic there is little to fear, but serious inroads have been made in local traffic receipts, both in the passenger and freight services.

But with all their difficulties railway administrators have more reason for optimism in regard to the railway situation in Great Britain today than at any time since the war. The year 1924 is a striking example of railway vitality. Starting with disastrous strikes of railwaymen and dockers, the passenger receipts fell by £1,204,861, but despite a miserably wet summer the deficit, by the end of October, had been turned into an increase of £674,100. There is still a total deficit of £3,000,000 through the fall in freight receipts, partly owing to bad trade, but substantial economies in operating expenses are expected to counterbalance the losses to some extent. The barometer of railway prosperity is read in conjunction with the price of railway stocks. Today prices are steady, and on the stock exchange railways are regarded with increasing confidence, due, no doubt, to the prospect of stability in government and the removal of the spectre of nationalization.

Britain's prosperity rests on the efficiency of its railways, and the centenary comes at a time when there is a reasonable prospect of a revival in trade and a final emergence from the depressing period following government control.



Panorama of São Paulo from the Clock Tower of Da Luz Station



A Tank Locomotive on the Eastern Railway

France Hopes to End Deficits

*Economy and higher rates expected to relieve taxpayers—
Electrification and other improvements*

By M. Peschaud

General Secretary, Association of Large Railway Systems of France

WORK previously undertaken by the railways of France for increasing the efficiency and safety of operation made much greater progress in 1924 than in preceding years. The application of audible repeating signals in the cabs of the locomotives has been actively pursued. For example, on the Paris-Orleans 223 locomotives were completely equipped with this device during the year, bringing the total for the system so equipped up to 847. On the Eastern the number of locomotives equipped with cab signals is 1,868 and on the P. L. M. 2,062.

The application of telephone train dispatching continues to advance. On the Eastern this application has involved the installation of 250 kilometers (kilometer = 0.621 mile) of telephone lines. On the P. L. M. telephone dispatching is in service over the entire line between Paris and Marseilles, and it will shortly be put into service on the line from Chambéry to Annemasse and from St. Etienne to Lyons. The railways have completed the substitution of electric for gas lighting on all steam railway express trains and on all suburban trains. The speed of express trains has been increased to equal that of pre-war days. The Southern express has a scheduled speed varying from 70 to 90 kilometers (43 to 56 miles) an hour, and may go on certain sections of the line between Bordeaux and Hendaye as fast as 115 kilometers (71 miles). An express train between Bordeaux and Cette attains 85 kilometers (53 miles) an hour between Agen and Montauban in the heart of the Pyrenees. The Toulouse-Tarbes train averages 75 kilometers (47 miles) an hour. Trains from Paris to Calais and from Paris to Lille make on the average 90 kilometers (56 miles) an hour.

The question of continuous brakes for freight trains has been decided by the Minister of Public Works in favor of the Westinghouse brake, conforming to the advice of the Superior Railway Council. The introduction of air brakes, however, will be very costly, and can only be gradually undertaken. Present conditions make necessary the greatest prudence in this connection.

STANDARD GAGE LOCOMOTIVES IN SERVICE ON FRENCH RAILWAYS

Line	January 1, 1924		January 1, 1914	Increase per cent
	Steam			
Alsace Lorraine	1,822		1,159	57
Northern	3,076		2,350	30
Eastern	2,482		1,889	31
P. L. M.	5,114		3,560	44
P. O.	2,857		2,105	36
Southern	1,224		1,061	15
State	4,240		2,896	48
Total	20,815		15,003	39

There are in addition 41 electric locomotives and 104 electric motor cars.

FREIGHT CARS AND CABOSES

Line	January 1, 1924		January 1, 1914	Increase per cent
Alsace Lorraine	45,730		29,628	54
Northern	91,340		81,029	13
Eastern	74,860		60,734	23
P. L. M.	120,085		105,568	14
P. O.	58,823		46,237	27
Southern	31,628		30,167	5
State	81,498		61,606	32
Total	503,964		414,907	21

As for passenger cars, the total for all railways has now reached 35,355, as against 30,916 in 1914, or an increase of 14 per cent. The increase in the number of seats available for passengers is even greater, since the new cars have replaced old ones of considerably lower capacity. The Northern notably is trying out a new type of third-class passenger car made entirely of metal, designed for main line service. This car is mounted on trucks and has 11 compartments instead of the customary 8.

MONTHLY STATISTICS (JANUARY TO OCTOBER) OF CAR LOADING (IN THOUSANDS)

	1922	1923	1924
January	45.5	55	57.9
February	47.6	54.4	61.6
March	49.6	56.9	63.2
April	46.7	54.9	59.1
May	49	54.2	59.7
June	49.5	56.7	59.6
July	50	55.1	58.7
August	50.9	55	60.3
September	52	57	62.8

Electrification

Electrification work undertaken in 1922, of which the present writer told in the Annual Review Number of the

Railway Age two years ago and of which he indicated the progress in last year's Annual Review Number, continues to be actively pursued. On the State Railway since March, 1924, electric traction has been gradually placed in service in the suburban area (right bank of the Seine) and the transmission lines of 90,000 volts from Paris to Orleans are almost complete. On the Southern, the equipment of the line from Dax to Toulouse is completed. That of the line from Bordeaux to Hendaye is in the course of execution. All trains are electrically operated between Montréjeau and Pau and on some branch lines.

A new high-speed electric locomotive built by the Société des Constructions Electriques de France has given very pleasing results under official tests. Pulling a train of 300 tons on the line between Montréjeau-Cazères, it accelerated in less than three minutes to a speed of 100 kilometers (62 miles) an hour. Thereafter, the train reached the officially recorded speed of 128 kilometers (79.5 miles) an hour. This is the highest speed so far obtained in Europe by a heavy electrically-propelled train under normal operating conditions.

On the P. L. M. the electrification of the line from Culoz to Modane is entirely completed.

New Lines

Only about 45 kilometers of new lines have been opened to service during the course of the year. On the other hand, work of this character is under way. On the Eastern, the Minister of Public Works has decided to give study from the point of view of public necessity and convenience of a project for a line to connect Saint-Dié and Ste.-Marie-Aux-Mines. This line constitutes the first of several projects known as "medial lines through the Vosges."

On the P. L. M. new construction work is following a regular course. The line from Nice to the Italian frontier at Sospel (63 kilometers) is approaching completion.

On the Southern, the construction of a new port at Verdon at the mouth of the Gironde has been started to replace the port of Pauillac for large vessels. The Administration of Bridges and Highways having completed the sub-structure for two trans-Pyrenean lines (Bedous-Canfranc and Ax-les-Thermes—La Tour de Carol), the Southern Company has started the installation of the superstructure.

Operating Results

Operating results for 1924 can be estimated as shown in the accompanying table.

OPERATING RESULTS (IN THOUSANDS OF FRANCS)
1923 (Actual Results)

Line	Receipts	Ex- penses	Capital and divi- dend charges	Manage- ment premium*	Net
Alsace-Lorraine	545	479	49	8	+8
Eastern	1,062	875	188	18	-3
State	1,094	1,221	288	13	-427
Southern	476	452	135	7	-111
Northern	1,225	1,100	279	25	-156
P. L. M.	1,956	1,672	444	23	-164
P. O.	1,030	918	271	13	-167
Total	7,389	6,718	1,655	107	-1,106

1924 (Estimated)

Line	Receipts	Ex- penses	Capital and divi- dend charges	Manage- ment premium*	Net
Alsace-Lorraine	600	560	54	11	+65
Eastern	1,213	950	200	20	+40
State	1,332	1,304	272	17	-260
Southern	573	480	155	8	-70
Northern	1,400	1,145	273	27	-48
P. L. M.	2,350	1,900	478	28	+40
P. O.	1,200	1,033	300	13	-150
Total	8,758	7,272	1,732	124	-383

* See *Railway Age*, December 31, 1921, page 1313.

The decrease in the deficit is due to the energetic policy of economy and to the increase in rates. The increase in weekly receipts for all the railways remains constant.

WEEKLY RECEIPTS (IN THOUSANDS OF FRANCS)

	1922	1923	1924
January	114	121	129
February	117	124	139
March	120	132	158
April	125	131	168
May	123	133	166
June	126	137	172
July	131	140	174
August	128	146	184
September	135	154	182
October	141	150	
November	135	143	
December	138	145	
Average	128	138	164

The loans which have been contracted for in the United States during 1924 are as follows: P. L. M., \$2,000,000; Northern, \$15,000,000; P. O., \$10,000,000; and Southern, \$10,000,000.

Rates

At the beginning of the year 1924, the Superior Railway Council was entrusted by the government with a project for the readjustment of rates instigated by the railways. This project was one of a number of measures undertaken by the government in defense of the falling value of the franc. Following the agreement of 1921, in which the new régime of the French railways was organized, the government undertook to make good the deficits of the privately-owned lines. In fact, the government demanded that the companies borrow for government account sums corresponding to the amount of their deficits, while it paid in cash the deficits of the State Railways. It is thus, that from 1921 to 1923 the companies had to borrow more than three billion francs to cover their deficits while the Treasury of France advanced to the State Railways a billion and a half francs for the same purpose. The government and the railways gave serious consideration to the dangers with which this policy threatened their credit—all the more, because the railway deficit, after having fallen from three billion francs in 1920 to less than 1,200,000,000 francs in 1922 and 1923, threatened to climb up again to 2,000,000,000 francs in 1924 because of the rise in value of fuel and other necessary supplies. To remedy this situation, the government and the companies reached an agreement no longer to cover deficits in this fashion and to assure their financial equilibrium by bringing about all the economies possible by efficient operation and by raising rates.

Consequently, following a favorable decision by the Superior Railway Council, the following increases were put into effect on March 10: for first-class passengers, 50 per cent; second-class, 48 per cent; third-class, 47 per cent; freight rates, 12½ per cent.

The three increases in rates put in effect since the war (in 1918, 1920 and 1924) represent a total increase of 170 per cent for first-class passengers, 160 per cent for second-class and 150 for third-class. For freight the increase is 170 per cent, but really the increase here is greater if one considers the unification of base tariffs of the various systems placed into effect since the war, which have carried with them certain increases. The co-efficient in gold value of French rates, however, is lower than that of most European countries, as is shown in the following table:

	Passengers (Average)	Freight
France	0.78	1.05
Germany	1.54	1.44
Switzerland	2.02	2.76
Great Britain	1.33	1.33
Netherlands	1.61	1.34

In the course of 1924 the railways have proceeded with a new general revision of basic freight tariffs in order to correct certain anomalies or to favor certain classes of commodities.

Moreover, in order to favor those families with large

numbers of children, supplementary reductions in passenger fares have been made and additional advantages accorded to large families traveling together.

Personnel

The total number of employees of the French railways, including those of Alsace Lorraine, is 498,451, or 12.2 per kilometer operated. Wage payments total 4,200,000,000 francs, or 60 per cent of the total receipts. The average wage is 8,200 francs and the average per kilometer 102,000 francs. To make allowances for increases



Scarassoni Railway Bridge

in the cost of living, the "indemnities of residence" (i. e., for living in places where living costs are particularly high) have been increased and the bonus for heads of families has been augmented by 50 per cent; moreover, new pension benefits have been granted.

One of the questions which has dominated the year 1924 has been that of the reinstatement of railway employees who were discharged following the revolutionary strike movement in 1920. The writer told in these pages, at that time, the nature of this strike and how the railways, conscious of their responsibility to the nation, were led to eliminate from their personnel the troublesome elements. Employees who were found guilty of overt acts of sabotage, violence, etc., were discharged to the number of 947. Moreover, employees who were actually engaged in other industries and refused to take up their work again in the railway shops after repeated notices at their places of residence, to the number of 10,832, were struck off the payrolls. In addition 4,846 provisional employees were laid off.

Scarcely had the radical bloc won its electoral victory of May 11, 1924, than it affirmed its intention of passing the sponge over all the disciplinary acts taken in defense of the political and social order. One of the articles of the amnesty law passed by the Chamber of Deputies ordered the immediate and obligatory reinstatement of all employees discharged because of the strike. This was insupportable. The most eminent counsel advised in effect that the strike, that is to say, the breaking of the labor contract, relieves the parties of their reciprocal obligations; that the removal from the pay-rolls only established this existing right and that the situation could only be changed by the free act of the companies. No law could impose it upon them. After the bill had been passed by the Chamber and before it had been acted upon in the Senate, an agreement between the government and the representatives was reached, in part, as follows:

"The government believes that the order and discipline

in the railway ranks will not be compromised, and that the necessary authority of the management will not be injured if the companies in response to the request of the government undertake themselves, of their own free will, measures of clemency. In view of these declarations, the representatives of the railway companies agree to a final revision of the records of their former regular employees who allowed themselves to be led away into the movement of 1920.

"Under the benefit of these observations the railway managements will examine the demands which those interested address to them before December 1 next. They will decide definitely what the outcome of those demands shall be and will fix the conditions in which reinstatements will be brought about. . . ."

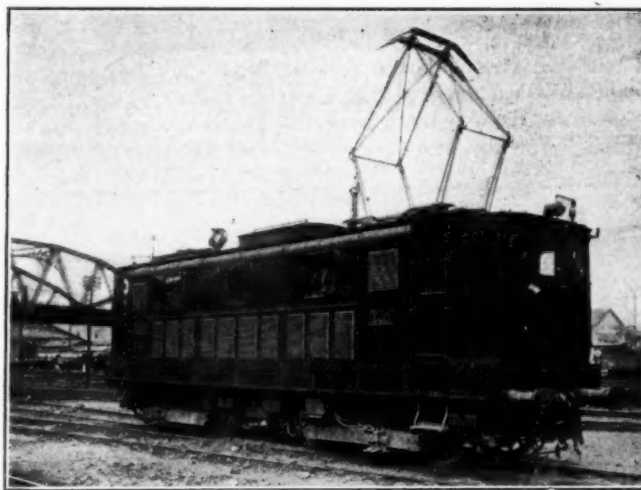
The companies are proceeding at the present time with the examination of the requests for reinstatement which have been received. They have firmly resolved not to reinstate the leaders. Meantime the government has reinstated on its lines most of the discharged employees who have so requested.

Eventual Re-organization of the State Railways

During the last session of the Legislature, farming out of the State Railway to a private operating company was proposed by the Superior Railway Council. As for the Alsace Lorraine line, an agreement had been signed between the government and the Eastern Company with a view to farming it out to this company. Neither project, however, had been finally approved before the Legislature adjourned. Now, however, the new radical majority favorable to government operation has thrown over both these projects, and has practically decided to consolidate the two government-owned lines.

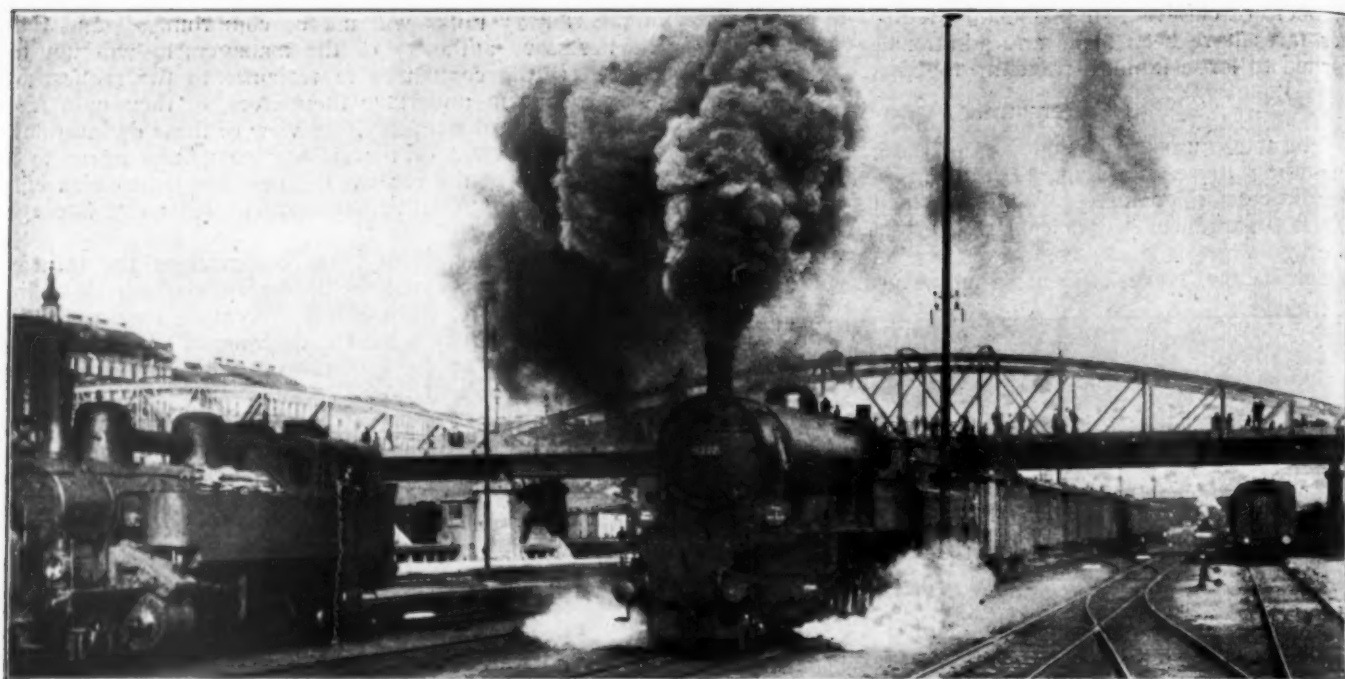
American Passenger Traffic Officers in Paris

The French railways had the honor and the pleasure to receive on October 22, 66 members of the American



A French Electric Locomotive

Association of Passenger Traffic Officers, having at their head the president of the association, W. B. Calloway of the Baltimore & Ohio. The members of the association were good enough to express flattering opinions of the speed and comfort of the French trains and were the guests of our railways and steamship lines. A banquet was tendered them by the management of railways. French railway men enjoyed this visit which will permit the opening up of new commercial and tourist relationships between the two nations, which should have a beneficial effect on the future.



Express Train Leaving West Station, Vienna

Increasing Efficiency in Austria

Modeling railway organization after private corporation brings improvement—Hungary electrifying

By A. Niklitschek

SINCE the conclusion of the war 1924 has been the first year to give the Austrian railways, and, therefore, the Austrian nation, a pleasant outlook for the future. For the first few years after the war, the losses

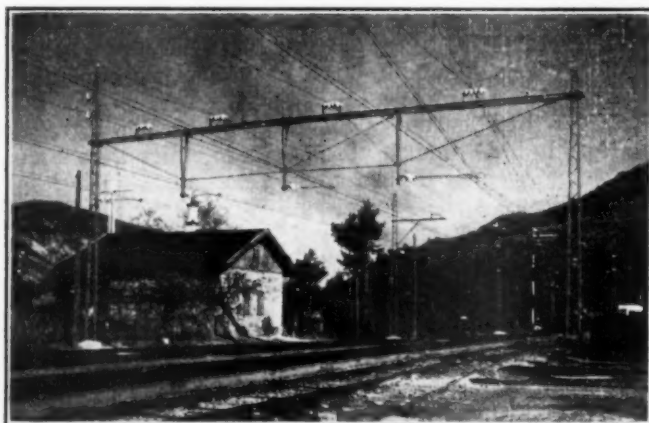
The old organization consisted of an ordinary government department—the Railway Ministry. In compliance with Sir William Acworth's recommendation, this form of organization was abandoned and the Oesterreichische Bundesbahnen (Austrian Federal Railways) were incorporated as a semi-public corporation, modeled after the organization of a private corporation. The administra-



A Hungarian Express Passenger Train

of the state railways were almost half of the total government deficit. Restoration of prosperity therefore depended absolutely on making the railways self-sustaining.

In 1923 the English railway expert, Sir William Acworth, came to Vienna to study the problem and the reorganization of the Austrian railways was undertaken in accord with his recommendations which involved the adoption of an entirely new policy.



Electric Contact Wires, Arlberg Line

tion is now in the hands of a committee of twelve members and a board of five directors, and the railways are operated as an ordinary money-making private enterprise—but with the government as the owner. Dr. Ing. Georg

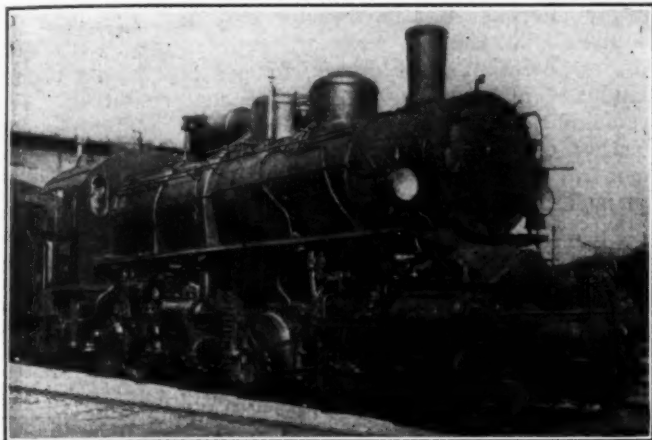
Gunther, a successful engineer and business man known for his ability as an organizer, was chosen as a director-general.

Increase in Efficiency

The abandonment of the government department form of organization and the adoption of the methods of private industry has brought a great improvement as shown by the accompanying table:

	100 train miles	100 car miles	1,000 net tons	1,000 gross tons	Gross income	Operating expenses
1st half 1923	259,200	5,580,000	1,799,811	5,452,440	\$24,509,000	\$28,840,000
1st half 1924	308,000	6,085,000	2,099,034	6,113,239	\$32,600,000	\$33,010,000
Increase....	8,800	505,000	299,213	660,799	\$8,001,000	\$4,170,000
Inc., per cent	2.91	9.13	16.62	12.12	33.13	14.4

The table shows that car-miles have increased three times as much as train-miles; that gross tonnage has in-



A Hungarian Mallet

creased one-fourth less than net tonnage; and that gross income has grown faster than expenses. In addition, very unfavorable coal contracts have been cancelled and expenses for fuel in 1924 will be about 15 per cent less than in 1923. Other savings will bring similar economies. Freight rates have been raised 10 per cent during 1924 but, placed on a gold basis, they are still only about one-third the pre-war rates. Passenger rates, expressed

under the new régime but there still remain 85,000 employees and 57,540 pensioners. The Austrian Federal Railways have a total route mileage of 3,195.* Considerable economies in the fuel bills may be expected as the electrification program progresses.

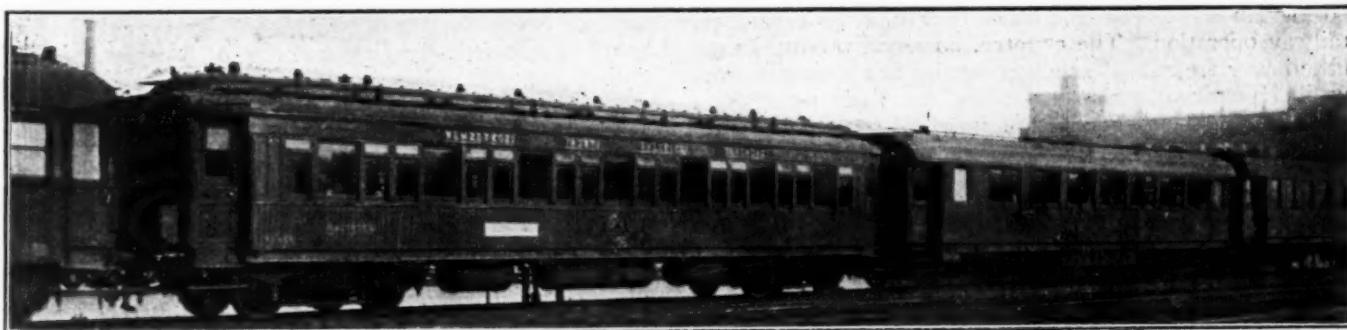
The topography of Austria is not favorable to railways, because of its mountainous character. The country does not produce much heavy traffic such as ore and coal. All the railway lines center on Vienna (1,800,000 inhabitants) as spokes to the hub of a wheel. Two double track lines lead into Czecho-Slovakia, one to Germany and Switzerland, one to Yugoslavia and Italy and two to Hungary. Vienna has six large passenger stations, one of which (the North Western station) was abandoned some months ago for purposes of economy. In spite of the comparatively dense population of the country, freight traffic is not dense—750,000 ton-miles per mile of line per annum. Only main lines are double tracked and there are only 12 miles of three and four tracks—these in the vicinity of Vienna.

The lines are of light construction, allowing an axle load of but 14.5 tons. One line of heavy traffic (Vienna-Salzburg) permits an axle loading of 16 tons.

Rolling Stock and Locomotives

The Austrian Railways possess 5,600 passenger cars (1.6 per mile) of which the greater part have but four wheels. The freight cars (34,000=10.8 per mile) are also of the 4-wheel type and handle loads of from 10 to 15 tons. During the year 1924, 500 passenger cars were ordered but freight cars will not be ordered until later.

The Austrian Federal Railways have about 2,680 locomotives (0.8 per mile). When the Austro-Hungarian monarchy was broken up into several countries, the rolling stock of the railways was divided up among the new countries. Austria did not fare very well in this division but got most of her allotment in old locomotives. It is not, therefore, strange to see locomotives of 60 or 70 years of age in service. Of course most of these old-timers are used only in switching service. Most of the locomotives for through passenger and freight service are of modern construction, equipped with devices which guarantee the most economical operation. For freight



A Hungarian Express Passenger Train

in gold, are about one-half pre-war, but these are to be raised by 30 per cent on January 1, 1925.

By reason of these savings, coupled with great reductions in forces, the budget for 1924 contemplates the following results: Gross income, \$68,000,000; operating expenses, \$69,500,000 or a deficit of \$1,500,000. The main item under expenses is the wage bill which will amount to \$46,500,000 or more than 60 per cent of the total. Altogether 7,500 employees have been discharged

as well as for passenger service a heavy 2-10-0 type locomotive is standard. For lines of easy gradient, 24 new 4-8-0 locomotives have been built during the last two years. These, like all modern locomotives in Austria, are equipped with the Lentz poppet valve gear. More-over 750 locomotives are equipped with feed-water heaters. During the past two years about 80 old locomotives have been rebuilt and equipped with superheaters and poppet valve gear. Generally the Hardy vacuum brake system is used but many locomotives and cars have the Westinghouse brake. Lately tests have been made with the Drolshammer pneumatic brake.

*This year the lines in Austria of the Southern Railway, the largest private company operating in Austria, were taken over by the Austrian Federal Railways. The length of the lines taken over is 480 miles.

Service Improved During Year

The running time of all trains was accelerated in 1924. Austrian trains are now running on faster schedules than before the war and are today the fastest in Central Europe. The speed of the best express trains and the *de luxe* international trains (Orient Express, Nizza Express, Swiss Express) is about 40 to 45 miles per hour, with the highest speed 63 miles an hour. This can be called an excellent record considering the mountainous character of the country. Freight trains are, for Europe, rather heavy. The average net load in Austria is about 200 tons as compared with 130 in England and 150 in France. The speed of freight trains varies from 12 to 15 miles per hour.

Electrification

The following lines have been electrified: 137 miles of heavy gradient from Innsbruck to Bludenz and 68 miles from Attnang-Puchheim to Steinach-Irding. The first line includes the famous Arlberg line with a maximum gradient of 3 per cent, long curves and the Arlberg tunnel, which is 6.5 miles long. The electric power for this line is supplied by the hydro-electric power-houses at Ruez and Spullersee. For the second line the power is supplied by the Gosau works. The electric power is single phase alternating current at 15,000 volts and 16 2/3 cycles. For power lines poles of wood, iron and reinforced concrete are used. The latter are favored because they do not require painting.

The intended electrification of the Tauern line (Schwarzach-St. Veit-Spital-Millstättersee, 65 miles) has been dropped, although the power station, which has cost about \$610,000 to date, has been almost finished. To complete the electrification as intended it would be necessary to borrow money from foreign countries and this is not practicable at present because of the high costs of foreign loans.

During the year 1925 only sufficient work will be done to prevent deterioration of existing structures.

Hungary

Hungary since the war is almost entirely flat country, its mountainous territories having been given to neighboring lands. This condition of course favors economical railway operation. The country, however, produces very little heavy freight. Passenger service has been improved until Hungarian trains are noted for their punctuality and cleanliness. The average speed of an express train

is about 43.5 miles an hour and of a freight train from 17.5 to 19 miles.

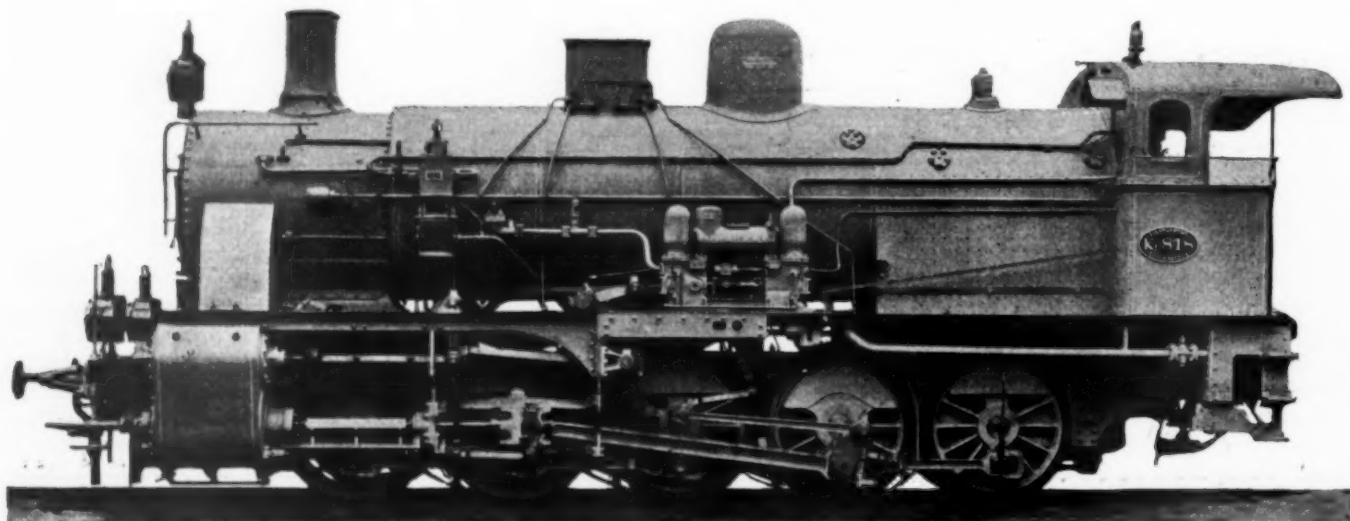
In common with other lands with depreciated currencies which must import large quantities of fuel and other supplies the Hungarian railways have suffered enormously. The high price of foreign coal and the high wages almost brought disaster. In 1921 a commercial type of organization was placed in charge. At that time there was for each mile of line 7.85 permanent and 6.2 temporary employees. The new régime has reduced this to 6.9 permanent employees. However, the Hungarian currency is not yet stable and further reductions in expenses are most urgently required.

Little Available Fuel

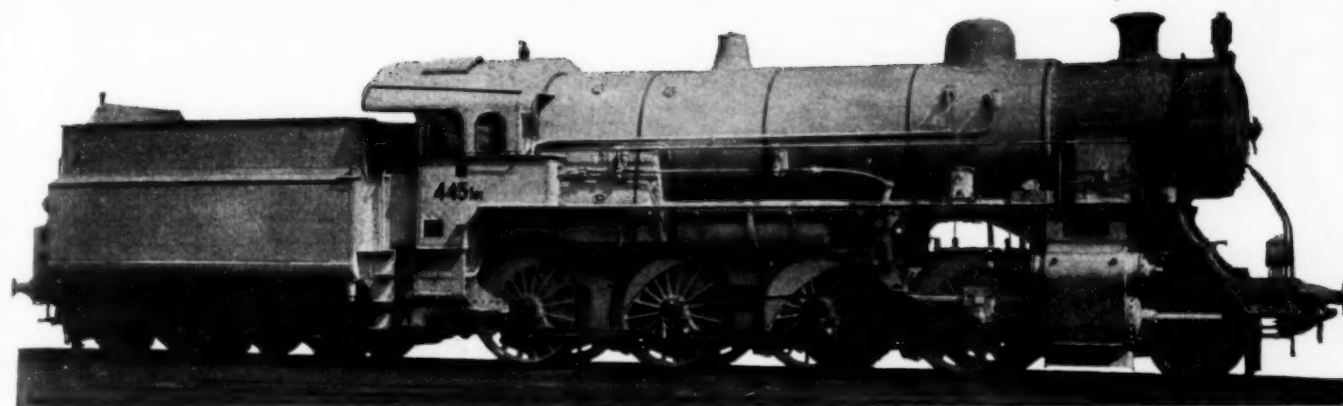
Hungary has lost the greater part of its pre-war resources. All the gas wells are gone as are 94 per cent of its potential water power, 85 per cent of its timber land and most of its better grade coal resources. The remaining coal areas which will last not longer than 60 years are of inferior quality. Power is Hungary's problem and electrification is the solution offered. It is planned to make the railway power lines sufficient to carry current for domestic and industrial purposes. The source of power must be low-grade fuel; there is little available water power. The current will be produced at 50,000 volts, 50 cycles, single phase, and supplied in this form direct to the trolley. It will be converted on the locomotive to three-phase, low potential power for the motor. This will be accomplished by means of a split phase type of synchronous converter. The locomotive will yield 34 h.p. per ton of weight. Regenerative braking will be employed.

Electrification

In August, 1924, the first electrified line, Budapest-Dimakeczi-Alag, 25 miles long, was placed in service. The power station is located at Istvantelek and local trains of from 200 to 400 tons were handled easily. The next line to be electrified will be that from Budapest to Bruck (Vienna). This is Hungary's line of heaviest traffic. For this line the power station is being built at Varpalota near the greatest lignite and peat fields. If all the Hungarian Railways were electrified a saving of 40 per cent in coal would be effected, bringing a saving of 8 per cent in operating expenses, allowing the higher grade of coal to be used in industry and, moreover, releasing about 2,000 freight cars for paying traffic.



Built in Austria for Greece in 1924



Built by Ceskomoravska-Kolben, Ltd., Prague

Czech Railways "Commercialized"

Law of 1922 providing for organization like private company finally made effective

By Dr. Václav Pártl
Ministry of Commerce of Czechoslovakia

IN 1924 the Czechoslovak State Railways began to put into practice the important law of December 18, 1922, which directs that state undertakings shall be managed as private commercial institutions. It took the government nearly two years to frame the by-law necessary to make the above-mentioned law effective, and to a certain degree it is to be regretted that it took so long. The law itself was proposed at a time when the neighboring German and Austrian railways were still in chaos, and a timely putting of it into effect would not only have contributed to the stabilization of Central Europe generally, but would have brought a great deal of economic benefit to the country as a whole.

All these moral and material advantages have been, so to say, wasted through the delay. The German railways, in the meantime, have been put—by means of international intervention—on a sound economic footing, and the Austrian railways also were organized on October 1, 1923, as a special state undertaking on the principle of private operation. These countries gave effect to an idea which originated in Czechoslovakia, but which will not be effective there until this year.

An excuse for this delay may be seen in the fact that the valuation of the Czechoslovak railway property, undertaken according to the peace treaties by the Reparations Commission in Paris, has not been finished thus far, and that consequently a very important basic figure—capital investment—in the balance sheet of the Czechoslovak railways as a self-supporting, privately-conducted undertaking still remains very uncertain. On this valuation depends to large degree the future rates of the Czechoslovak railways, and one can understand very well why the Czechoslovak Railway Administration has avoided until now basing its accounts on any arbitrary figure which might perhaps prove prejudicial before a definite settlement of the valuation question had been made by the Reparations Commission.

The above-mentioned by-law prescribes that the operation of the State Railways is to be conducted by a gov-

erning body (managing committee) on the principle of a private board of directors, the main aim of the legislative measure being to bring the railways to pay at least their own expenses and not to clog the budget of the state. The recently introduced state budget for 1925 consequently shows considerable formal changes as compared with that of the previous year, its railway section containing as a special title the railway operation account. This account is fully separated from the purely public administrative section of the State Railway Administration budget, and it is especially encouraging to see that this operating account is balanced with an estimated profit of 191,531,240 Czechoslovak crowns (about \$5,745,937) for the year to follow. We are told that the figures presented have been compiled on the basis of previous years' experience, so that the strong hope expressed that the estimates will actually materialize, appears to be well founded.

Government Purchasing Private Lines

The whole system of the Czechoslovak Railways comprises 13,260 kilometers of lines (kilometer = 0.621 miles), to which in the latter months of 1924 will be added a new line in Slovakia (Zvolen-Krupina) 35 kilometers long. There have also been constructed 1,250 kilometers of industrial sidings in 1924, serving 2,152 manufacturing establishments. In the total mileage of the country 4,213 kilometers are privately owned but are operated by the state; they are of secondary importance. These private lines are gradually being nationalized, and since 1919 a total of 902 kilometers of line have been bought from private owners.

The operation of the whole system is conducted by eight sectional directions (managements). There are 2,443 stations, 17 storehouses, 13 shops, 44 power-houses and 123 departments for maintenance-of-way on the lines of the railways.

Rolling Stock and Motive Power

By September 30, 1924, the Czechoslovak Railways had 4,401 locomotives, as against 3,424 locomotives on De-

cember 31, 1919; of this increase 475 locomotives have been newly built in local plants, the rest having been acquired with the nationalized private railways. The car situation is as follows:

	Passenger cars	Service cars	Postal cars	Freight cars
December 31, 1919.....	6,346	1,575	376	65,106
December 31, 1923.....	8,100	2,554	418	113,760

Revenues and Expenses

The operating revenue in 1923 was 3,429,837,700 Czech crowns (\$102,895,131), of which total 2,573,646,200 Czech crowns (\$77,209,386), that is about 79 per cent, was derived from freight service. The above given gross revenue is slightly lower than that in 1921 and 1922 in consequence of the general lowering of freight rates. Up to the end of September, 1924, the gross receipts attained the figure of 3,049,500,000 Czech crowns (\$91,385,000), so that it may fairly be expected that the revenue of the present year will be by about 350,000,000 Czech crowns (\$10,500,000) higher than that of 1923, that is nearly 150,000,000 crowns (\$4,500,000) more than indicated in the preliminary budget for 1924. Operating efficiency is to some degree reflected in a general way in Table I.

In the estimates for 1925 the total train kilometers

new freight tariff introduced on March 1, 1924, on the average by 11.5 per cent, this decrease being as great as 40 or 50 per cent in the case of express goods and freight of higher tariff classes.

Additions and Betterments

As for investment, 12,416,200 Czech crowns were spent in 1923 on the construction of new lines, on maintenance of way, 379,849,100 Czech crowns, and on the acquisition of rolling stock, 290,375,500 Czech crowns, giving a total of 682,610,000 Czech crowns (about \$22,730,000 on the basis of \$1 = 33 Czech crowns). There are at present under construction three important railway sections necessary to improve connections between isolated parts of the system; one of these has a tunnel 1,728 meters (5,672 ft.) long; eleven complementary road sections are to be put under construction shortly. On about eight different main lines needed for through traffic, tracks have been or are being doubled. In many cases the roadbed is being improved to meet the requirements of heavier traffic, and stations and yards are being enlarged and modernized; also shops are being re-equipped, enlarged and put on a more efficient basis for carrying on their work.

TABLE I—LOCOMOTIVE AND TRAIN KILOMETERS

	1919	1920	1921	1922	1923	1924	1925
Actual locomotive kilometers.....	85,879,904	107,462,068	122,803,810	127,578,612	143,592,569	150,000,000	156,000,000
Preliminary estimates of locomotive kilometers.....	77,510,020	101,936,340	113,800,000	128,500,000	138,000,000	150,000,000	156,000,000
Train kilometers—Actual for 1919-1923; estimated, 1924-1925	49,241,997	66,384,411	80,444,810	85,198,498	84,111,505	96,676,000	100,200,000

*Not yet available.

are divided into 10,200,000 kilometers to be done by fast passenger trains, 53,000,000 kilometers by ordinary passenger trains and 37,000,000 by freight trains.

Decreasing Car Shortage

The relation between the demand and actual supply of freight cars is improving slowly but steadily, the percentages of requirements satisfied being: In 1919 for box cars, 56 per cent; for open-top cars, 73 per cent; in 1920, 48 per cent and 68 per cent; in 1921, 82 per cent and 86 per cent; in 1922, 99 per cent and 92 per cent; in 1923, 100 per cent and 87 per cent; in 1924, 99 per cent and 92 per cent.

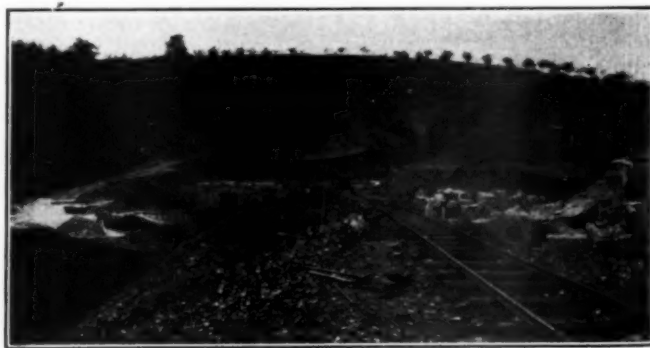
The figures indicating the relation between the consumption of supplies and operating performance in Table II also give the impression of steady betterment, in many cases approaching very nearly pre-war conditions.

TABLE II—OPERATING STATISTICS

	1912	1919	1920	1921	1922	1923
Normal fuel consumption per locomotive-kilometer in kilograms	28.2	40.9	41.1	36.2	32.8	29.3
Fuel consumption on locomotives per 1,000 kilometers in kilograms....	145.4	202.8	205.7	181.5	177.7	164.4
Normal oil consumption by locomotives per 1 locomotive-kilometer in kilograms	43.3	74.8	75.	69.2	58.4	51.7
Number of kilometers run per locomotive yearly..	38,520	26,071	28,890	31,512	32,192	32,520
Thousands of ton-kilometers per locomotive....	7,566	5,259	5,765	6,288	5,936	5,801
Number of locomotive-kilometers per motive power employee	6,460	4,350	4,760	5,096	5,675	6,019
Number of locomotive-kilometers per motive power employee in thousands of ton-kilometers	1,268	877	950	1,017	1,028	1,072

As far as the rate policy is concerned, the passenger fares remain stationary, being, since 1920, on the average about 350 per cent above pre-war, decreasing for long distances to 180 per cent higher than before the war; freight rates have been lowered—a necessity in consequence of the state policy of currency deflation—by the

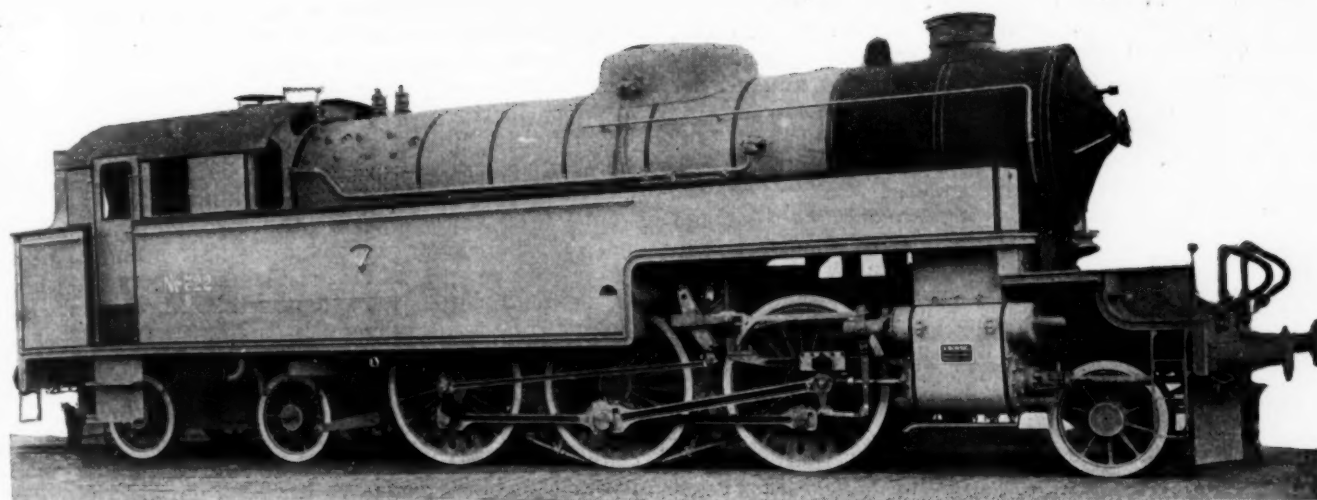
In all about 129 bridges have been built or reconstructed since 1922, for which purpose about 7,334 tons of steel have been used. Not fully satisfactory, as yet, is the situation of rail renewal. Theoretically, 360 kilometers (kilometer = 0.621 mile) of rails and about 500 switches should be renewed each year. Actual performance in this regard in 1923 was 346 kilometers of rails and 429 switches. The five-year average was considerably bettered in 1923 (in the previous years the figures having been much lower), being 45 per cent of the theoretical requirement in the case of rails and 55 per cent in the case of switches. The renewal of rails was conse-



Building a Tunnel Section on the Prague Belt Line

quently short in the five years by 55 per cent, and that of switches by 45 per cent. According to the official statement about 473 kilometers of rails and 640 switches will be renewed in 1924, which is about 25 per cent more than the theoretical requirement.

There has been considerable building activity by the Czechoslovak State Railways to help secure adequate housing accommodation for its employees. In 1924, 3,446 apartments were acquired in new houses for this purpose and 1,800 apartments in remodeled houses.



Locomotive Built by A. Borsig, Berlin-Tegel, Germany

Outlook for the German Railways

Drastic steps taken in 1924—Must find ways and means of operating more economically

By Richard P. Wagner
Eisenbahn-Centralamt, Berlin, Germany

THE year 1924 found the executives of the German railways in a very difficult position. The mark had been stabilized, and after crossing out eleven noughts in the balance sheet everybody in Germany found himself to be poor. There was everywhere sufficient equipment to produce with, but no liquid money. Bank rates were therefore so high as to make production at reasonable selling prices practically impossible. The railways, especially the State Railway forming more than nine-tenths of the entire mileage, felt the effect of this crisis.

During the years of the inflation the rolling stock had been rehabilitated to a certain extent and could be considered adequate to the demands of ordinary traffic. But the occupation of the Ruhr, cutting out the industrial heart of the country, upset all reasonable anticipations and helped to reduce the traffic to a fraction of its usual size. Railways seldom have much liquid money, and the German State Railways, owned by a state practically penniless after the inflation, had even less. Freight rates and passenger fares had to be increased to balance the running expenses; all other expenditure was stopped immediately. Moreover 25 per cent of the employees were pensioned or discharged.

Condition of Equipment

This crisis has lasted practically all the year and will lead to sure disaster unless the gold pumped into the veins of German trade by the international loan enables industry to produce and export sufficient quantities to make the trade balance active. During the greater part of the year a number of locomotives—from 3,000 to 6,000—and a corresponding number of freight cars have been in reserve ready for service. On many lines short freight trains with light locomotives had to be run to keep up a daily service.

The number of locomotives and cars scrapped in 1924 was 1,400, or 5 per cent, and does not quite reach the average; no orders have been given for locomotives in 1924 except for a few local narrow gage and electrified lines and for experimental purposes. The last locomotives ordered in 1923 were delivered one by one—the factories stretched out the production as long as possible to keep the wheels going. Many non-superheater locomotives, 40 years of age or more, are still in service, especially in Southern Germany; they cannot be wholly dispensed with as bridges and rails of many lines will not carry up-to-date motive power. Very few orders could be given for coaches and freight cars, though these were offered at low prices; the average age of the rolling stock has therefore been lengthened to that extent.

The locomotive handling plants (engine terminals) have been a weak point of the German railway system for many years. Water treatment is sufficiently developed, but the turntables in many important terminals are too short to accommodate heavy motive power; the equipment for making minor repairs is frequently obsolete and insufficient. Naturally very little can be done to better these conditions, as alterations interfere with traffic and are very expensive.

The maintenance of track and bridges after being neglected during the war has been brought up to a satisfactory standard, though many bridges designed for 1.1 metric ton (1.23 short ton) per foot, carrying locomotives not exceeding a wheel load of 8.5 metric tons (9.52 short tons), are still numerous even on trunk lines.

An Economical Freight Car Unit

The traffic conditions in Germany are quite similar to those in the United States and demand heavy traction. Coal must be carried from the mining districts in the west and the southeast all over the country; farming products

raised chiefly in the north and east must be taken to the highly populated industrial centres in large quantities. The best way to transport these products economically is by the introduction of heavier car loads and heavier motive power.

An eight-wheel freight car of 50 metric tons (56 short tons) capacity has been chosen as a standard unit. As bogie trucks would have unduly increased the weight of the car two pairs of wheels were placed close to one another at both ends of the car. The car has a saddle-shaped bottom lengthways and is arranged for automatic discharge on both sides of the track. The axles are fitted with several kinds of ball and roller bearings for test purposes. In 1924 the tests of these cars were successfully completed and a few trains have been ordered and put in service. They will run between the mining districts and some of the industrial centres. These cars have been fitted with automatic couplers partly of the Willison, partly of the Scharfenberg type so as to test both. It is expected that nothing but 50-ton cars (56 short tons) will be ordered in the next few years. This will mean an effectual saving for the railways, as the length of a coal train will be reduced to less than 50 per cent of its present length, and the train load can be considerably increased without altering the length of sidings. The automatic discharge is expected to allow more running hours per day and cut down the labor cost.

All these cars are equipped with Kunze-Knorr air brake; other rolling stock is being equipped with these brakes so that about one-half of every freight train is now controlled from the locomotive. Presumably in 1925 it will pay to collect air brake cars at certain stations and run a number of air brake trains on most lines.

Heavier trains mean heavier motive power, so new types of standard locomotives have been designed for 10 metric (11.2 short) tons wheel load, 2-10 coupled freight engines of 45,000 lb. and 4-6-2 passenger engines of 22,000 lb. tractive effort. Thirty of them will be delivered in 1925. The variety of types of locomotives on the German State Railways and minor variations in every type make a free distribution impossible, since spare parts for every type could only be stored in a few work shops. It is the purpose to build standard engines with most parts absolutely interchangeable. The standardization will extend to all types of locomotives required for a systematic and economical operation of the system, so that standard locomotives will finally replace those of Prussian, Bavarian, Saxonian, etc., origin. To make the best of the present equipment the existing types of locomotives will be standardized as far as possible; i.e., all minor parts, especially the boiler fittings, will be exchanged for standard parts. The standardization has been started in conjunction

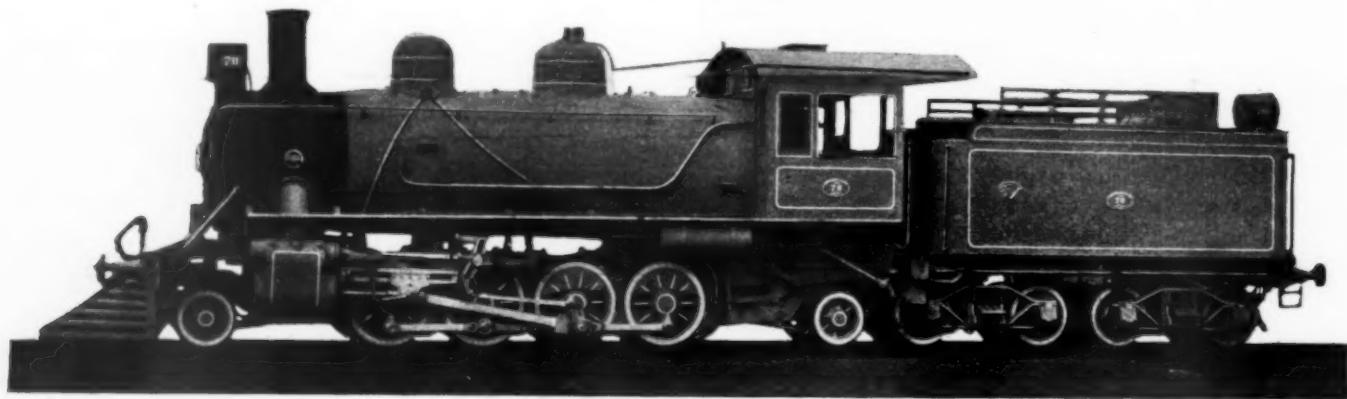
with important alterations in the workshop management. Since the capital invested in locomotives and cars must be reduced, the former repair periods of 20 to 45 days for a locomotive are no longer tolerable. Therefore, most parts of every incoming locomotive, including sets of wheels and the boiler, will be repaired separately and stored. The engine, fitted with parts supplied by the store, will thus be able to leave the shops within a period ranging from 1 to 15 days. To keep the stores within economical limits certain classes of locomotives have been assigned to certain workshops. A reasonable effect from this should be apparent in 1925. It is expected that it will reduce the repairs to be made in enginehouses.

Gasoline Rail Motor Cars

For light traction several gasoline rail motor cars have been put in service, among them one driven by a Diesel engine. In the way of general improvement of motive power a turbine locomotive has been designed in connection with Krupps', which has been shown at the Seddin exhibition and will be put in service after completing the tests on a stationary plant. A few test runs on the line showed the satisfactory working of all parts. Eight Diesel locomotives have been ordered, among them three of 1200 h.p. each, one of these to be equipped with an oil gear of the improved Lentz type, the other with compressed air transmission. A high-speed compressor directly driven by the oil engine will transmit the power to ordinary locomotive cylinders, the air being heated by the combustion gases so as to improve the thermic effect; the third will be equipped with a magneto-coupled speed gear. These locomotives will be delivered in 1925 and are looked forward to as means for utilizing cheap oil from a low grade lignite. Efforts are also being made to use pulverized lignite or rather the lignite coke left after separating the oil for locomotive fuel.

The department of maintenance and bridges has made great strides lately toward adapting the trunk lines as quickly as possible to the heavy motive power. A new standard rail weighing 33.2 pounds per foot is being laid; and the bridges on these lines will be reinforced to carry locomotives of 10 metric (11.2 short) tons wheel load or 2.45 metric (2.74 short) tons per foot. New bridges are generally designed for a wheel load of 12.5 metric (14 short) tons. As the strengthening of track and bridges seems the most important means preparatory to a more economical train service the greater part of the little money left over after paying for running expenses is used for this purpose.

Great strides are being made to put the German railways on a paying basis and to come up to the expectations of the Dawes plan.



Mikado Built by Baldwin for the Argentine State Railways



An Electrified Line in Spain

A New Railway Régime in Spain

Uncertainty over new legislation now in effect hampered progress—Valuation based on earnings

By A. C. Blackall

RAILWAY development in Spain has made but little progress during 1924. Various projects were discussed, a few were begun, and several extensions have been made, but it has on the whole been a period of "marking time." This was due in the early part of the year to the rumors that under the dictation of the Military Directorate an entirely new railway law, which would have far-reaching effects both on existing lines and those in embryo, was likely to be brought into force. This produced a state of uncertainty and retarded all new work.

That the rumors were well founded was proved by the issuance of a Royal Decree on July 12, 1924, proposing what amounted to a co-partnership between the government and the various private companies desirous of embracing it, officially described as "an intervention of the state to better the railway services." A further salient point is that it left the railway companies themselves to decide whether or not they would enter the scheme. This decree called for consolidation of the railways in order to do away with a large amount of overhead and administration expenses. It plans the standardization of rates to avoid competition and contemplates the unification of wages and working conditions in order to avoid strikes and social disputes. It also purposes to improve the use and types of rolling stock, standardizing them so that greater quantities can be built in Spain.*

The government is to provide the necessary capital to carry out the improvements contemplated by the decree

by a special loan which will put funds into the treasury of the combine. The government will pay into this treasury all amounts received as taxes from railways and any other taxes which it may wish to contribute from time to time. The intervention of the government will be exercised through the "Consejo Superior de Ferrocarriles" (Superior Railway Council), which will represent the public interests, thus practically nationalizing the railways. It will also see that the railways are operated to give maximum profits and that all new capital expenditures are justified economically.

Valuation Based on Market Value of Securities

The Consejo will itself appraise the value of concessions held by private companies more exactly than at present shown by the companies, and will determine also the amount of their cash capital and the value of all stocks, bonds, etc., according to their market value and not their nominal value. This is a very important clause since the railways will have their earnings proportioned on the valuations thus arrived at. Rates are to be modified so as to cover at least all operating expenses, and the earnings are to be distributed according to the amount invested by the government and the capital of the railways as determined on the above basis. The government will take a percentage of the earnings according to its investment and will allow returns to the companies according to the valuation which the Consejo places upon them. A special agreement is to be made so that in the distribution a difference will be made between the amounts paid to the prosperous companies and those in a bad way.

The Consejo will also advise the dates of the expirations of concessions, and will study past advances made by the government, but the companies will, for the time being, continue paying interest at the old rates for the same.

It was necessary for all applications for admission to

*In this connection an instance of the extraordinarily keen competition from German firms which has to be faced in every country is worthy of note. It concerns large contracts for locomotives placed by the Norte Railway. Despite the extremely high tariff the German bids, which include the duty payable on delivery, were much below any other tenders, not excepting those of Spanish builders. The latter quoted 3.40 to 3.65 pesetas per kilo, whereas a well-known German concern quoted 2.60 pesetas per kilo, which leaves 1.60 pesetas approximately for the net price, as the total duty is about 1 peseta per kilo. This means that the Germans were offering locomotives at about 25 cents per kilo (less than 12 cents per pound) as against the Spaniards, 50 cents. The Norte Company, however, acting in a patriotic spirit, refused to allow the contracts to leave the country, and the locomotives are to be built in Spain notwithstanding the great difference in cost.

the new railway régime to be made prior to October 12. As a result 15 of the broad-gage companies, operating 6,700 miles of line, and 34 narrow-gage, operating 1,460 miles, have filed their applications. There consequently remain outside the régime 6 broad-gage and 46 narrow-gage lines, operating respectively 256 and 1,370 miles of line. The principal broad-gage lines not joining are the Central Aragon, 185 miles, and the Madrid Underground, while nearly all the narrow-gage lines are suburban lines, steam trolleys or semi-industrial lines, many of which are connected with mines. All companies which have not joined the new régime forfeit government subventions and loans, and will not be allowed to increase their rates.

No Rate Increases for Lines Not Under Decree

It will be seen that the new régime is practically a "two-edged sword"; hence the reason for nearly all the leading lines falling in with the idea. If they enter the agreement, they receive a sufficient advance from the government to undertake their pending work, and the amount that they might have to pay over to less prosperous companies under the decree would probably be eaten up in any case if they had to pay interest on a new loan. On the other hand, for the roads remaining out of the compact, it is certain that the government will not only withhold financial help, but will probably also levy a large extra tax on profits. Once the matter is under way and the government loan advanced, it should result in a large amount of development work being started.

As for the Central Aragón, which elected not to enter the compact, this company was well situated to run entirely on its own, since from its inception it received a heavy subvention and has never needed to apply the 15 per cent surcharge or seek advances from the government to meet increases in wages.

It does not follow, however, that the companies which have applied for admission are compelled to remain in the scheme. At the time of writing the sub-committee of the Superior Railway Council is busy on the work of the valuations of some 80 lines, and the fixing of their rates. All companies in the scheme are required to submit an inventory of capital and rolling stock and a valuation of their enterprise based upon earnings for the last 15 years. Some alarm is expressed at this condition, especially among the foreign-owned lines, since owing to the war in many cases business was abnormally light, and the valuations will probably be made on a corresponding scale. It is optional, however, for the companies to withdraw from the scheme should they consider the valuation inequitable. The greatest trouble is that the adjustment of rates is to be done by government officers at Madrid, many of whom have no knowledge of the conditions and requirements of the various districts through which many of the lines pass.

New Construction and Electrification

The plan for the construction of the Ontaneda-Calatayud line, which has long been in contemplation, was officially approved on July 2, and the concession was granted on September 10. This is the largest undertaking of the year. The line is to be 250 miles long, and is estimated to cost \$50,000,000. The question of its finance has caused considerable comment of a not altogether favorable nature. Although the company is Spanish (it must be so nominally, according to law), it is closely connected with British financial interests. The British interests had naturally hoped to place large orders for construction materials in England, but exactly how far this will be practicable remains to be seen. The law provides that Spanish concerns only shall be requested to bid on materials, but should no Spanish con-

cerns be able to fulfill the conditions, then foreign concerns may be permitted to make offers. There is also a clause giving Spanish bidders a preference of 10 per cent over foreign bidders, to which has also to be added freights, duties and insurance.

It has been pointed out that one great reason for the slow growth of new railways in Spain is the fact that the capital account is nearly always overloaded at the start by too many shares being distributed to the promoters. In the case of the Ontaneda-Calatayud line the distribution is approximately 10 per cent of the total estimated cost of construction, the promoters receiving 70,000 shares of 500 pesetas each, or 35,000,000 pesetas (over \$1,000,000). The capital is to be advanced by the Bank of Spain against a deposit of the Central Mining debenture stock. A feature of the construction of this line is that the railway company receives Spanish government bonds as sections of the railway are completed with which to recuperate itself and provide for further work.

The Norte and the Madrid-Zaragoza-Alicante lines have under consideration, either jointly or by the Norte alone, the construction of a line 50 miles in length between Cuenca and Utiel. This, by joining up the present Avanzuez-Cuenca line of the M. Z. A. to the Valencia-Utiel line of the Norte, will give a fairly direct line between Madrid and Valencia, of some 200 miles, in comparison with over 300 miles by the existing route. The country between Cuenca and Utiel is very mountainous and consequently not very favorable to railroad construction, but, if the new line is built, it will put an end for the present to the agitation for a Madrid-Valencia direct line. The lines at present under construction are chiefly extensions of existing lines. Included in these is the completion of the Trans-Pyrenean line from Lerida to St. Giron, which was scheduled for opening during the fall of 1924.

Considerable attention is being paid to railway electrification throughout Spain. This is largely due to the success achieved by the Madrid Underground line. This line, which operates barely five miles of road, of which 1¼ miles were opened during 1923, has regularly paid 10 per cent dividends since 1921.

During 1923, 32 miles of new railways were opened, the 7½ miles between Cerdedilla and Quadarrama being electrically operated. Parts of the Norte line are also being electrified, the Puerto de Pajares portion having been completed in August last. In all, the electrical section is 15 miles, and American electric locomotives are in use on the 12 miles completed. They are rated at 1,680 hp. and can haul 300 tons up a 2.2 per cent grade at 22 miles per hour. Twelve of these locomotives are now at work and have displaced 28 steam locomotives. The tunnels on the electrified section are being greatly improved. Under steam they were allowed to become abominably dirty and were practically without ventilation. Alternating current is generated at 30,000 volts and transformed for electric traction to 3,000 d.c.

In general, during 1924 conditions may be said to have shown a very slight improvement. The general increase in wages which in 1920 was made compulsory by the government, was not nearly met by the 15 per cent increase in rates, which was then sanctioned, and as a result it has been found necessary to provide monthly funds with the greatest regularity to continue operations.

It was this condition of affairs which really to a great extent led to the Royal Decree of July 12, 1924, under which the Superior Railway Council was set up, the majority of the members of which are government engineers. It is as yet too early to tell what the effect of the new régime will be, but it seems certain that some interesting developments will result.

Political Control in Yugoslavia

Government-owned railways languish while funds go into work of political significance

By Prince Lazarovich-Hrebelianovich

IN last year's Annual Review Number of the *Railway Age* in discussing Yugoslavia's railway problem it was stated that the new state of the Serbs, Croats and Slovenes found itself upon its creation possessed of a system of railroads composed of separate groups which for the most part were not interconnected and each of which, before the war, formed the transport system of a state no longer in independent existence; also that the new country's principal Adriatic seaports (Split and Shibenik) were without rail communications with the hinterland.

The tasks before the railway administration of the newly created country were: (1) The rehabilitation of the then-existing lines, which had suffered either in deterioration of track and rolling stock through the heavy war traffic and lack of maintenance, or had suffered heavy damage from actual military operations; (2) the rebuilding into main traffic lines of many lines constructed in pre-war time to suffice only for local traffic; (3) the linking by new constructions of the various isolated railway groups; (4) the acquisition of new and adequate rolling stock; (5) the purchasing or "naturalization" of railroads owned and operated by foreign private corporations under charters granted by states no longer existing; (6) elaboration of a building plan for new lines to complete the existing system and give rail transportation facilities to large areas of the country which were without such facilities.

Progress Which Has Been Made

The reconstruction of property damaged by the war was practically completed early in 1924; and a few secondary lines were converted into main traffic lines. However the strengthening of substructure and relaying with rails of a heavier type on a larger scale has not yet been begun for lack of over 5,600 miles of rails which were to have been furnished by Germany on account of reparations; and of the new rolling stock of Germany has also not yet been able to make full delivery. During 1923-24 the railway systems owned by private foreign corporations were acquired by the state through purchase. The most important of these was the 463 miles of line owned by the Austrian Southern Railroad Company (Südbahn) together with rolling stock, etc., at a purchase price of 5,800,000 gold francs (about \$1,160,000) annuity to the company up to 1968, when its original charter from the late Austro-Hungarian government lapses; then a single payment of 200,000 gold francs to the bondholders' fund and further a yearly contribution for 25 years towards the redemption of bonds not paid during the war—that contribution to be fixed in relation to the income of the system from the traffic on the Trieste line. This liability is incurred, however, only if Italy should fail to make full payment of its contracted obligation to the Southern Railway.

In 1920 the planning section of the Ministry of Communications elaborated a building plan of new construction to cover a number of years—including the new short lines needed for linking up the existing systems. The plans call for the building of 5,912 miles of line, of which

4,442 miles would be of standard gage and 1,470 of narrow gage (30 in.).

Of this projected mileage 194 miles of line have already been built and are either in operation or will be by February, 1925. The more important of those lines are: the standard-gage line of 72 miles from Ogulin to Knin, which when opened to traffic will connect the magnificent Adriatic harbors of Shibenik and Split with the standard-gage system of the country. Of no less importance are the 36 miles of line from Uzice to Vardishte and the 13 miles of line from Stalatch to Paratchin (30-in. gage), also to be opened to traffic by February, 1925, which will interconnect the Bosnian, Dalmatian, the Western and Eastern Serbian narrow-gage systems. This will create an extended 30-inch gage railroad system with a main line nearly 650 miles long, permitting direct freight and passenger service from the Danube near the Rumanian border across the whole country to the Adriatic seaports of Metkovich and Gruz-Dubrovnik, which ports, however, are small and will not permit development beyond their present capacity.

Finances

The financial means at the disposal of the general management of the railways for the accomplishment of those tasks were: 455,000,000 dinars of the 500,000,000 dinars, 7 per cent internal loan of 1921; 359,000,000 dinars derived from the \$10,000,000 instalment paid in 1921 by Messrs. Blair & Co. of New York on the so-called Blair-Yugoslav loan. (\$10,000,000 represented as exchange was at that time 990,000,000 dinars.) Both of those sums totaling 814,000,000 dinars (or \$8,954,000) were used in the restoration of the road, new constructions and repayment of short term bank loans. All other funds required for railway construction and restoration were provided by the so-called surplus earnings of the roads themselves. That earning amounted in 1921-22 to 312,167,194 dinars and in 1921-22 to 245,688,906 dinars (surplus earning of the Southern Railway not included). For the year 1924-25 the surplus earnings are estimated at only 47,689,584 dinars inclusive of the earning from the former Southern Railway.

Rolling Stock

The rolling stock at present in service on line is insufficient for the growing traffic. On standard-gage roads the ratio is 5.9 for cars of all types per line mile and 0.38 for locomotives per line mile. On the narrow-gage (30 in.) Bosnian-Dalmatian and Serbian lines, taken as a connected system, the ratio for locomotives is 0.28 per line mile, and for cars of all types 4.5 per line mile.

The rolling stock awaiting repairs amounts to an average of 30 per cent for standard-gage, and of 43 per cent for narrow-gage locomotives and to an average of 13 per cent for standard-gage and of 6 per cent for narrow-gage (30 in.) cars of all types. This situation of deterioration of material is best illustrated in the statement by Mr. Prokich, general manager of the Bosnian-Dalmatian Railway (made in a signed article by him in the "Ekonomist," a Yugoslav periodical), which says that at present

on his system there are per diem 19 per cent of cars and 15 per cent of locomotives in bad order or more than there were during the heavy war-traffic period of 1914-18. He ascribes this condition not to any greater traffic strain but to lack of skill in the repair-shops, which shops are well fitted with all required machinery. This lack of skill, according to him, causes also greater deterioration in the machinery of the shops and that at even a more rapid rate than the deterioration of the rolling stock in service on line.

Traffic

In 1919 on standard and narrow-gage systems combined the total of train runs amounted to 160,194. In 1921 the total train runs had increased to 344,668 and for the year 1923-24 the figures given are: Total train runs, 575,545, of which 28,470 were express runs, 102,545 ordinary passenger runs, 184,915 mixed trains and 259,515 freight runs.

Railways Run by Politicians

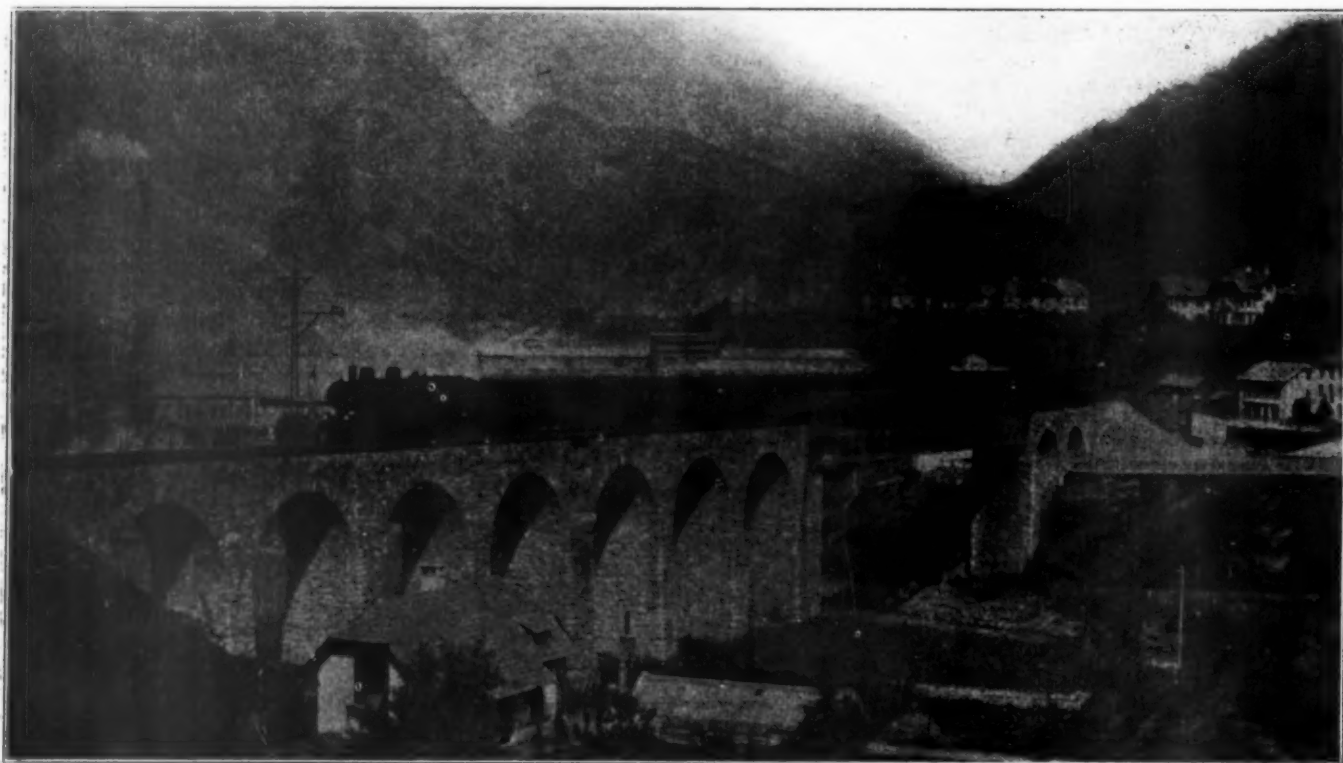
Jugoslavia has unhappily not yet settled down politically, and since the formation of the state after the armistice, continues to be in the throes of a constitutional crisis. The great questions of monarchical or republican form of government and of centralist or federalist organization of the state have not yet been solved. Hence, as is quite natural in the midst of such political conditions, partizan-ship is considered of greater value than expert knowledge and experience. The railway administration in all its branches has not been able to escape the pernicious evil of political interference in technical services.

For purposes of balancing the country's budget the need of funds in the so-called political departments of the government is considered of greater necessity than the need for rehabilitation and new construction of railroads,

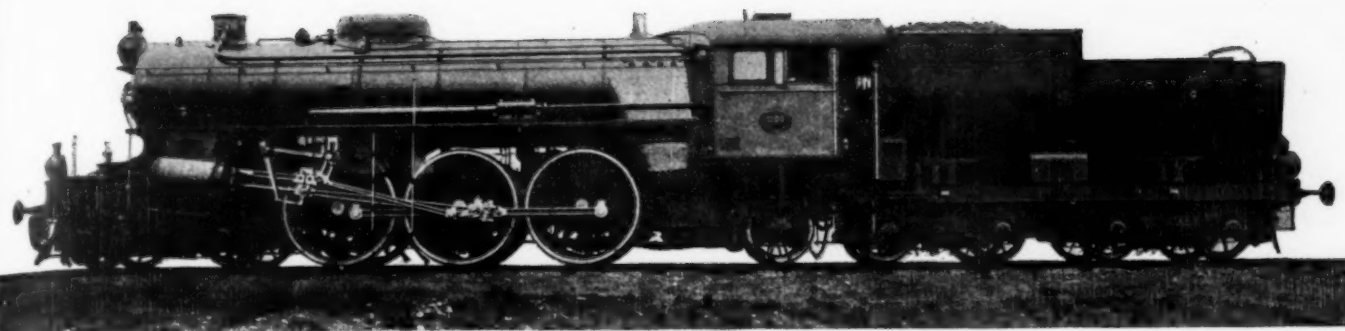
consequently some very ingenious spirit has invented the formula that railroad restoration and new construction should be defrayed from the surplus earnings of the roads—i.e., earnings above costs of operation, maintenance, interest and repayment of railroad indebtedness.

Surplus earnings, however, on the railways of Jugoslavia are just as scarce as they are elsewhere in Europe under present day railroad and traffic conditions.

The years from 1919 to 1921 showed a considerable railroad deficit. In 1921-22 there was a sudden surplus earning of 312,167,194 dinars (or at the then average exchange \$3,434,000). Since then, however, the surplus has decreased until for 1924-25 it is estimated at only 47,689,584 dinars (or at present rates of exchange, \$690,000), a sum absolutely inadequate to cover the expenses already earmarked for urgently needed railroad development. And should the proposed downward revision of import and export freight tariff rates materialize it is more than likely that this small surplus earning will be wiped out and the roads will face a new deficit. During the last few years, even when railroad operations showed surplus earnings, new construction was time and time again interrupted for lack of funds. For the same reason neither contractors nor workmen could be paid for months; cars and locomotives sent to foreign countries for repairs could not for long periods be returned because of lack of funds to pay the bills. Unnecessary risks were taken to run locomotives over lines not built for heavy power. The new type freight locomotives delivered by Germany on account of reparations, when put on the line for their trial runs, crushed the substructure and broke the rails. Such conditions show how starved the Yugoslav State Railways are; and it will be little short of a marvel if efficient operation, adequate rehabilitation and needed new construction can be achieved under such circumstances.



Viaduct on the Arlberg Line, Austria



A Swedish Passenger Locomotive

Swedish Railways Are Doing Well

Will pay fixed charges this year—Electrification and new construction progressing

By Lars Akselsson

Chief Statistician, Swedish State Railways

THE area of Sweden is 173,000 square miles (about the same as that of Ohio, Indiana, Illinois and Kentucky combined) and its population is 6,000,000. The country is situated in the same northern latitude as Alaska but climate and natural conditions are more favorable to human activity. Agriculture is an important industry, but economic life is dominated by the immense resources of water-power, wood and iron-ore

population Sweden holds the record for Europe with 1.6 miles of railways for every thousand inhabitants. According to principles laid down in the 1850's, the railways are based on mixed state and private ownership, most of the trunk lines belonging to the state. The length of the

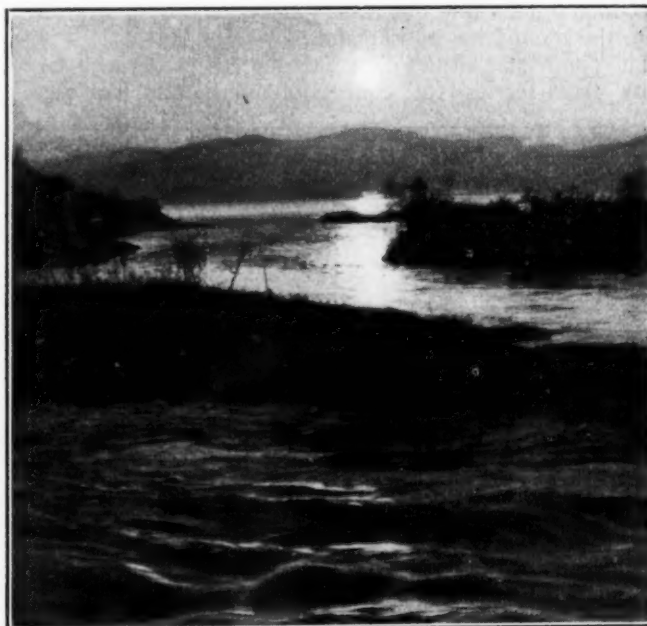


A Dining Car on the Swedish State Railways

and the industries based on these. Swedish products which are known the world over include ball-bearings, matches and telephones. The life of the country depends on an active export trade and this is carried on to a great extent with England, France, Germany and Russia, and to a lesser degree with other European and overseas countries. Commerce with the United States has greatly increased since the war (exports being mainly wood-pulp, paper and iron-ore and imports grains, oils and automobiles).

Both Public and Private Ownership

The Swedish railway system is extensive and well developed. As regards length of line, in proportion to



The Midnight Sun in Lapland

State Railways is less than the private mileage but the actual work done is far greater on the state lines, as shown in the following figures:

	State railways	Private railways
Length of line, miles.....	3,540	6,100
Passenger miles, millions.....	749	523
Freight ton-miles, millions.....	1,227	645
Train miles, millions.....	14	18
Car-axle-miles*, millions.....	526	401

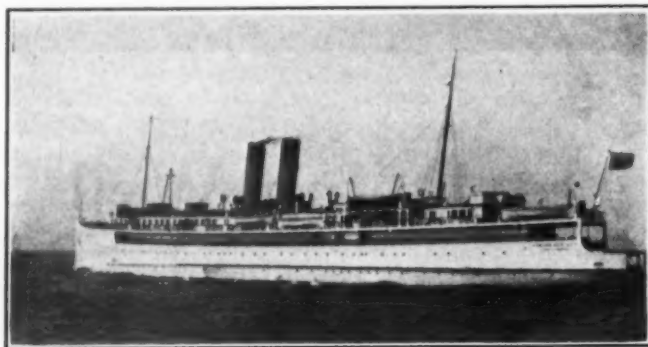
*Some freight cars have two axles and some four.

As regards density of traffic Sweden can not compare

with the United States, since many of its bulky commodities are shipped by water.

New Lines

The state is engaged in an important railway construction program for the northern part of the country, the so-called Inland Railway, with branch lines. About 80 miles of new line were opened in 1924 and a further 450 miles are under construction or planned. In the southern part of the country only a few local railways (pri-



A Swedish Train Ferry

vate) are under construction. Other works, such as rebuilding stations, second-tracking, etc., are being carried on.

Electrification

The electrification of the main line from Stockholm to Göteborg (290 miles) was in progress in 1924 and it is intended to complete the work in 1925. The line from Lulea to Riksgransen (280 miles) had previously been electrified. This line has a very heavy traffic in iron ore from the mountains of Lapland.

The peninsular situation of Sweden has made necessary many train-ferries for connection with the European



An Iron-Ore Mountain in Lapland

mainland. The train-ferry service from Trälleborg to Sassnitz employs the largest ferryboats in Europe. Each ferryboat has a capacity of 3,000 tons and has accommodations for 1,700 passengers and 550 feet of track for cars.

The total capital invested in the State Railways amounts to \$270,000,000, the greater part of which, or \$220,000,000, is represented by government bonds. Annual interest amounts to \$10,000,000, which sum will be carried over and above operating expenses by the State Railways in 1924. It may, therefore, be said that the financial situation of the Swedish State Railways is entirely satisfactory.

During the war the railways had a very difficult time.

(Coal at one time, laid down in Sweden, cost from \$40 to \$60 a ton.) In 1918 the State Railways had a deficit of \$16,000,000. After the war came the crisis of 1921, which brought down freight traffic to a minimum, and at the same time forced reductions in rates. During the last three years things have greatly improved and are still improving. Freight traffic is increasing and it has been possible to make several very heavy reductions in rates. However, because of falling prices and wages and vigor-



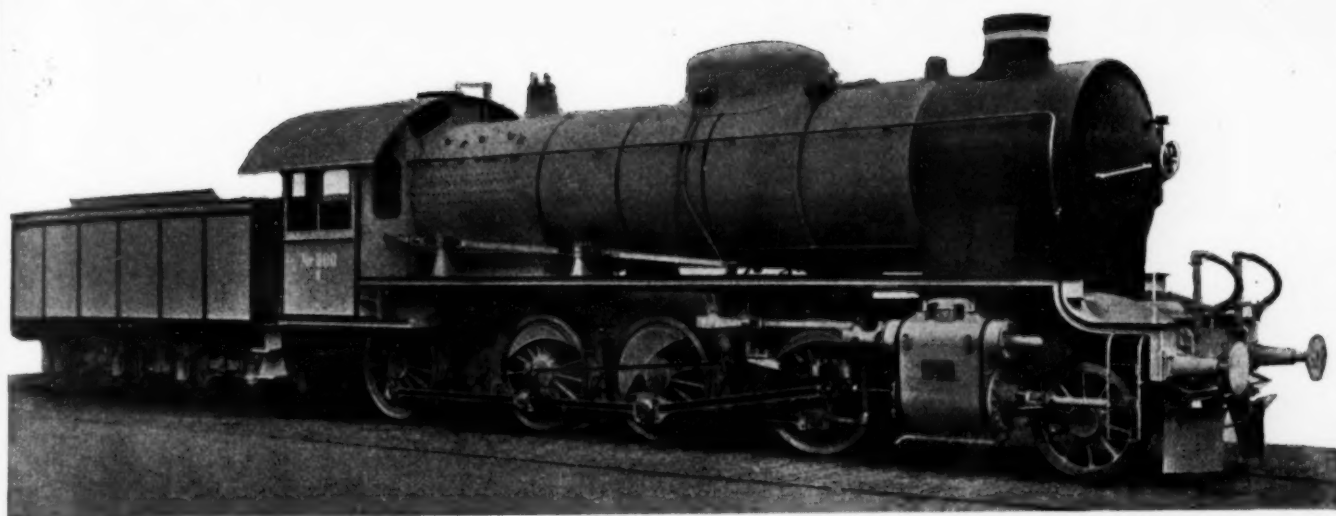
A Compartment in a Second-Class Sleeping Car

ous efforts for greater efficiency, operating expenses have been reduced to such an extent that not only have the rate reductions been compensated for but net income has been increased. This development is shown in the following table:

	Millions		Millions of dollars*		
	Passenger miles	Freight ton miles	Revenues	Expenses	Net income
1920.....	830	1,328	91.9	84.0	7.9
1921.....	730	1,099	68.9	67.0	1.9
1922.....	725	1,213	55.5	49.0	6.5
1923.....	749	1,227	53.5	44.4	9.1
1924 (approximately)	726	1,335	52.2	41.8	10.4

*The figures are here given in dollars; 1 Swedish Krona = 0.268 dollars; the value is at par with gold.

Increased operating efficiency is essential to railway improvement. Since 1913 the number of passenger-miles and freight ton-miles have been increased 14 per cent and 5 per cent respectively, and to handle this increased traffic there were used 6 per cent less train-miles in 1924 than in 1913 and 10 per cent less car-axle-miles. This improvement has been brought about by betterments to stations and lines, better locomotives, heavier trains and through a reorganization of different details of the service. The mechanical equipment of the Swedish State Railways is of good quality and is kept in good condition and still further improvements are being made.



A Danish Freight Locomotive

Danish Railways Earn Surplus

But not sufficient to pay capital charges—Seek now to be put on business basis

By E. Terkelsen

Comptroller, Danish State Railways

ONE-HALF of the approximate stretch of 3,100 miles of railways of Denmark, including all main lines for through traffic between the parts of the country and abroad, are owned and operated by the government. The other lines are private railways, in which, however, the government is almost always interested by the ownership of a part of the capital stock.

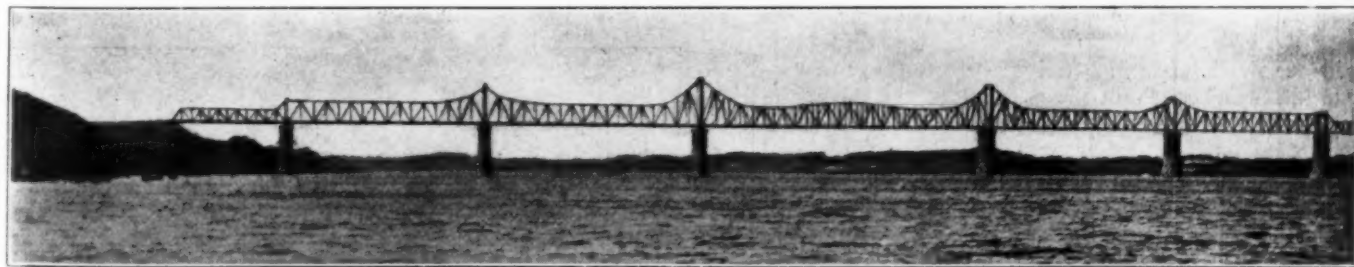
Operating Surplus

While the operation of the State Railways in 1916-22, as a result of the world war and its after-effects, showed an ever larger deficit, it was possible in the fiscal year 1922-23 to earn a surplus over operating expenses of one million kroner (\$267,000 dollars with the exchange rate at par) and in 1923-24 a surplus of three million kroner (\$800,000). The success during the last year is due chiefly to a reduction in expenses, as the traffic increased

proximately 125 per cent above pre-war rates. In the summer of 1924 there was introduced, as an experiment, the right for third class passengers to buy excursion tickets for the price of a one-way ticket. This arrangement resulted in a considerable traffic increase and was, without doubt, economically advantageous to the railways. The two largest expense items—wages and fuel—are again showing an upward tendency, wages as a result of the cost-of-living bonus which varies automatically with prices, and fuel, as a result of the low exchange rate of the Danish krone, since practically the entire consumption—approximately 1,000 tons per day—must be bought abroad (at present in Great Britain).

Seek to Put Railways on Business Basis

In calculating the surplus there has hitherto not been figured any payment of interest on the capital invested



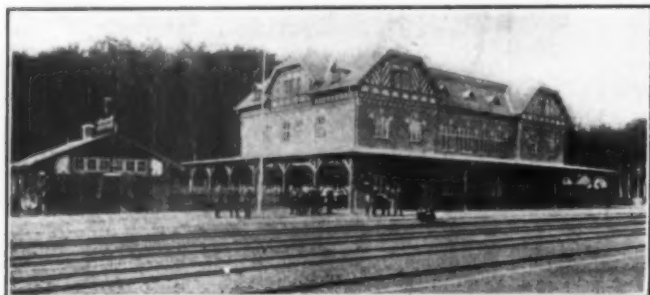
A Bridge on the Danish State Railways

only with regard to freight, passenger traffic having decreased. Since the rate reduction in the spring of 1922 no rate changes have been made, and passenger rates are now approximately 80 per cent and the freight rates ap-

in the railways (approximately \$130,000,000), but the claim for interest payment has recently been raised in Parliament (Rigsdagen) and in connection with which there has been introduced a bill by which it is intended

to give to the railways a somewhat freer position than at present from legislative action, among other things endowing the management with greater authority to establish the rates within fixed limits and to make freight agreements following businesslike principles.

Railway construction during the year consisted primarily of the new Næstved-Ringsted line, the first link of a longitudinal railway through central Zealand (Sjælland). This line makes possible a connection with Germany via Gjedser, on which line the new steam ferry "Danmark" now gives travelers coming from foreign countries to the south a first and favorable impression of the standard



Typical Country Station Near Copenhagen

of the Danish Government Railways. In addition, the construction of double-track and track reinforcement on the more important lines is being continued. The building of over-head and subway road crossings, characteristic of the Danish railways for the elimination of grade crossings, is also being continued. Since 1911 there have been built in all about 550 such concrete viaducts.

The locomotive stock has in the last year been increased with two new types: One a three-cylinder, four-coupled freight locomotive operating weight 127.3 tons, and one a three-cylinder, three-coupled tank-locomotive for local



Double Tracking, Showing Type of Highway Bridge

train service, operating weight 92 tons. Locomotives have hitherto been built abroad, namely in Germany, but the Danish "Frichs" works in Aarhus have now taken up locomotive building. Cars are built exclusively in Denmark at the "Scandia" factory in Randers. For locomotives as well as cars, however, raw materials—with the exception of wood—must be imported.

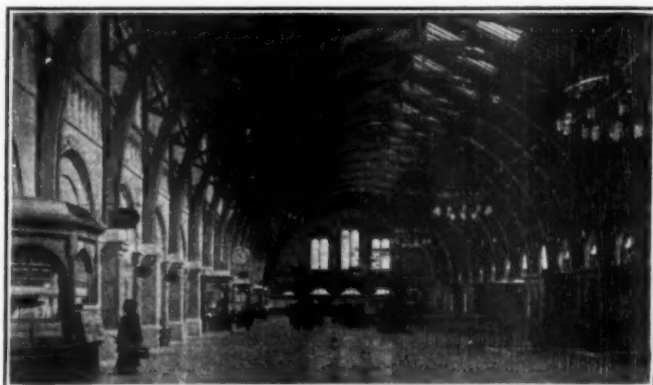
Within the central administration there has been planned among other things the use to a greater extent in the accounting department of the American Hollerith system, which has already been used for several years at the statistical bureau of the State Railways.

In the spring of 1924 an important step was taken for improvement of the through-traffic between the different parts of the country by the passage of a bill providing

for the building of a railway bridge across the Little Belt, where hitherto traffic has been taken care of by steam ferries, which particularly after the reunion of South-Jutland with Denmark in accordance with the peace of Versailles were no longer satisfactory. The bridge will carry two tracks and will be of the cantilever type, approximately 850 meters long, with the largest span of 220 meters, and 33 meters above the water. The piers will be built of reinforced concrete and the superstructure of steel. There are difficult current and depth conditions in the Belt, and the bridge which is estimated to cost approximately 40 million kroner (approximately \$10,700,000) is by far the greatest of its kind in this country. The State Railways' chief construction engineer has on account of the bridge been making a tour of study in the United States in order to make himself acquainted with American bridge-building practice.

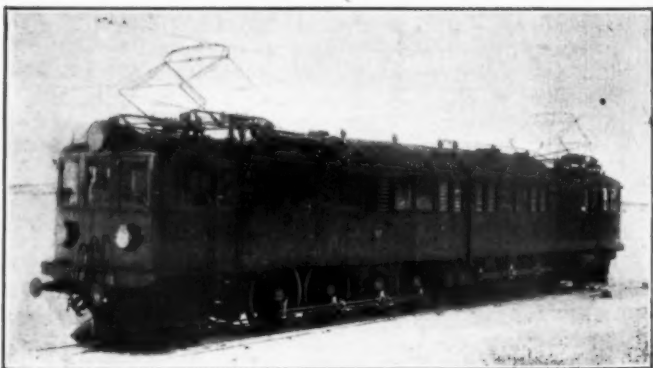
Motor Truck Competition

The State Railways, as well as many of the short and secondary private railways, have had some competition with

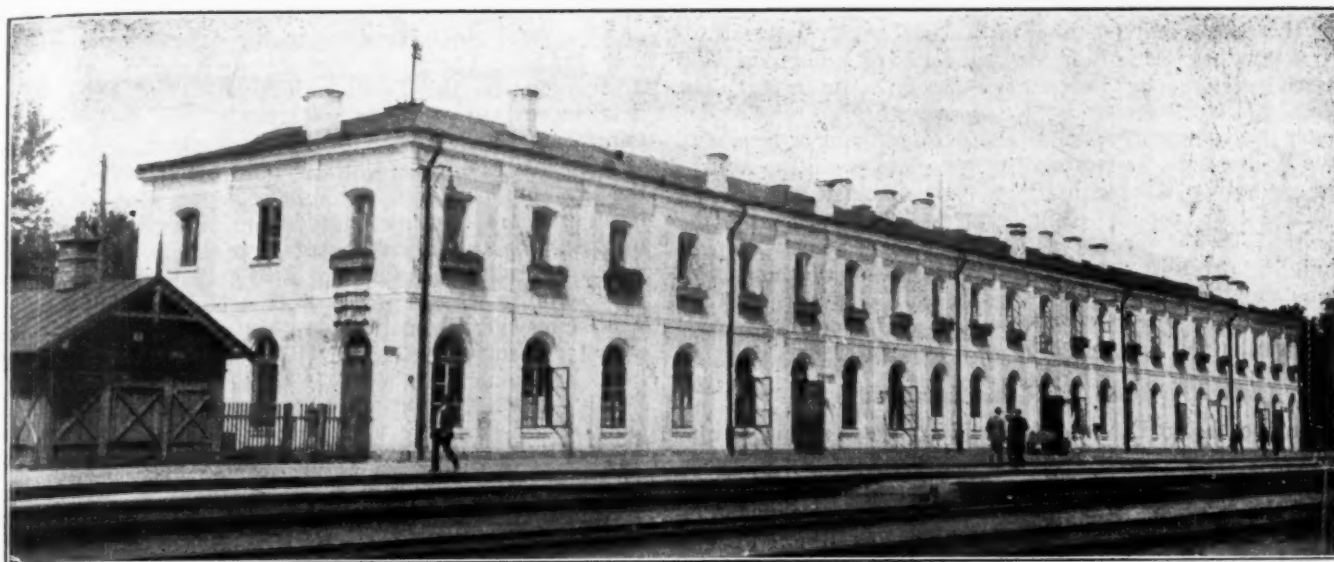


Concourse in Copenhagen Station

the highly increasing automobile traffic, private motor trucks as well as motors run by transport companies. Several private railways have, as a step in the fight for passenger traffic, introduced operation with motor cars (generally gasoline, but sometimes Diesel-electric). The State Railways are now having built a motor train intended to be run on a short stretch in the vicinity of Copenhagen with frequent service but a relatively small number of passengers. A considerable development is expected in the application of motor vehicles on the railways. Moreover, consideration is being given to the possibility of establishing closer co-operation between the railways and the owners of motor vehicles, whereby these two forms of transportation may be made to complement each other.



A Swedish Electric Locomotive



Polish Railway Station at Lapy

Polish Railways Steadily Improve

*Operate at a profit for the first time—First
Polish-made locomotives*

By Roy V. Wright

POLAND is making a brave fight to improve its economic situation. Its industries are in position to furnish goods for export, but the great Russian market is closed on the east, and its relations with its other neighbors have not been any too cordial, although

year were such that the budget for 1925 anticipates a net revenue of 30,000,000 zlotys. This is a great relief, for the railway deficit has in the past made a heavy drain upon the resources of the government. The Grabski Ministry insisted upon a complete separation of the railway budget from that of the state, the introduction of economies and the raising of rates in order that the railways might pay their way. The surplus will be used for making much needed railway improvements.

The treaty of Versailles gave Poland access to the sea, but Danzig was continued as a free city. The arrangement has not proved satisfactory, and on July 4, 1924, the Polish minister of industry and commerce signed



Railroad Y. M. C. A. Kindergarten at Bialystok

they are steadily growing better. Germany needs Poland's forest products and trade relations with that country are improving. Relations with Czecho-Slovakia, after disputes over the boundaries, are also improving. Meanwhile, an extensive exhibition of Polish manufactured goods was held at Constantinople during the latter part of the summer, with a view to developing markets in Turkey and the Near East. The results of this venture are not yet apparent.

In March, 1924, the state railways were operated for the first time without a deficit. The operations for the



New Car Repair Shops at Lapy

an agreement with a Franco-Polish consortium covering the construction of a seaport at Gdynia. If all goes well, Poland will have an adequate and efficient seaport of its own in operation in 1930.

The program for replacing the destroyed steel bridges

in the devastated portions of Poland, north and east of Warsaw, has been going steadily forward. These bridges were replaced by temporary wooden structures. The damaged steel was brought to a large bridge repair shop near Bialystok. By adding about 25 per cent of new steel the bridges can be restored to first-class condition and be re-erected on the old locations. Available funds are not sufficient to keep the plant going at full capacity, but the work is being pushed as rapidly as possible. The rebuilding program for the railway stations and other buildings and facilities which were destroyed is progressing; the new structures are constructed to Polish designs and are attractive and well built.

Shop Facilities Enlarged

In the Wilno Direction or section, the car and locomotive repair shops at Lapy are being greatly enlarged; this includes the rebuilding of some of the older shops and the addition of a number of new structures. The new car shop was completed during the summer. The great difficulty at Lapy has been to provide housing for the larger number of workers that are required at that point. It had been the purpose of the government to provide for the housing requirements at the same time that the shops were rebuilt. Sufficient funds, however, were not available for both purposes, and at the earnest solicitation of the employees it was decided to go ahead



Railroad Y. M. C. A. Building at Bialystok

with the shop enlargement, rather than to hold up the entire project until sufficient funds were available. It is not unusual, therefore, for married men to be separated from their wives, the men living in a men's dormitory and the women living in special dormitories provided for their use. The program for this year calls for the building of several large houses and a considerable number of smaller ones.

The employees are so greatly interested in the development of their country and of the railroad, that they are willing to work under severe handicaps for the time being. Some of the workers are building their own homes outside of working hours, and they have even given their services freely in order to help improve the railroad property. This is particularly true in connection with the erection at Lapy of a water tower and a building to house the fire department, which serves not only the railroad, but the entire community, as it does at many of the railroad towns.

Railroad Y. M. C. A. Activities

One of the outstanding features of railroad operation in what was formerly Russian Poland is the splendid service which is being rendered by the Railroad Y. M. C. A. This development was started by American Y. M. C. A. representatives at the earnest solicitation of the Polish government, based upon the service which had been rendered to the Polish legions in the World War

and to the Polish prisoners in the different prisoner of war camps. There are now 14 Railroad Y. M. C. A. associations on the Polish railroads. The work was at first supervised and administered by the American organization, but last year the Polish National Y. M. C. A. was formed, and the work is now being carried on by the Poles themselves, American representatives acting in an advisory capacity. Funds for the carrying forward of this work are difficult to secure because of the struggle which the railroad is making to balance its budget, and a very striking feature of the work is the fact that most of it is being carried on by volunteer workers. To a large extent the equipment of the "Y" buildings has also been made by the men on their own time.

The Railroad Y. M. C. A. equipment at Lapy, for in-



Railway Water Tower, Lapy, Poland

stance, includes a large frame building with a stage, drop curtains, piano and moving picture outfit. Here are provided moving picture entertainments, musicales, operettas, plays and various sorts of entertainment. An old piano was purchased at a small price and rebuilt and put into good condition by the men themselves. The scenery for the plays is painted by the men—and is well done. Adjoining the auditorium is a room provided with ovens and simple apparatus for the serving of refreshments. Beyond this is a social hall, which during the daytime is used as a kindergarten for the children of railroad workers, between the ages of three and nine. An American cannot but be impressed by the similarity of the kindergarten to an up-to-date institution of the same sort in this

country. The importance of this particular development cannot be appreciated unless one understands that the children are largely those of women workers, and that except for this provision, the children would have to be neglected to a great extent, since the schools have not yet been advanced to the point where they can care for them, and this kindergarten is practically the only cultural factor in the community for children of this age.

In a nearby building social rooms are maintained where the men can read, play games and secure light refreshments. In another part of the town athletic grounds and

up the morale of the railroad workers. The railroad authorities are naturally enthusiastic over it. Some of the other smaller points have a less elaborate program than that at Lapy, while at others it is more extensive. At Wilno, for instance, the Railroad Y. M. C. A. has a large and substantial building with some paid workers, and including most of the activities which are carried on in an American city Y. M. C. A. association.

First Polish-Made Locomotives

The first Polish-made steam locomotive was delivered to the railroad administration by the Warsaw Locomotive Works on December 23, 1923. It was designed by Polish engineers and built by Polish mechanics largely of Polish materials. Poland now has two locomotive manufacturing plants, and there are also facilities for the building of freight and passenger cars. The locomotive building plants are handicapped because of the necessity of having to take over a considerable amount of the heavy repair work which the railroad has not as yet ample facilities to care for. A serious problem in the maintenance of equipment is caused by the great number of types and varieties of locomotives and cars; this because Poland is made up of what were formerly parts of Russia, Germany and Austria, and the equipment under the peace treaty was contributed by all of these countries. According to a report by the ministry of railways, there has been an increase of from 2,795 to 4,593 locomotives on the Polish State Railway in the four years ending January 1, 1924; passenger cars have increased in the same period from 6,475 to 11,735, and freight cars from 63,206 to 129,722.

Much new line must be built properly to develop the country and its natural resources. There has been under consideration the granting of concessions to French and British companies to build two lines, one eastward and one northward from the coal district in the southwestern section of Poland. The present lines are neither adequate nor properly located to distribute this fuel to the best advantage.

The future of the railroads naturally will go hand in hand with the improvement of the economic condition of Poland. Recent months have witnessed a considerable change for the better, and except for unforeseen emergencies, this year should show a marked advance in the further upbuilding and prosperity of the Polish railways.

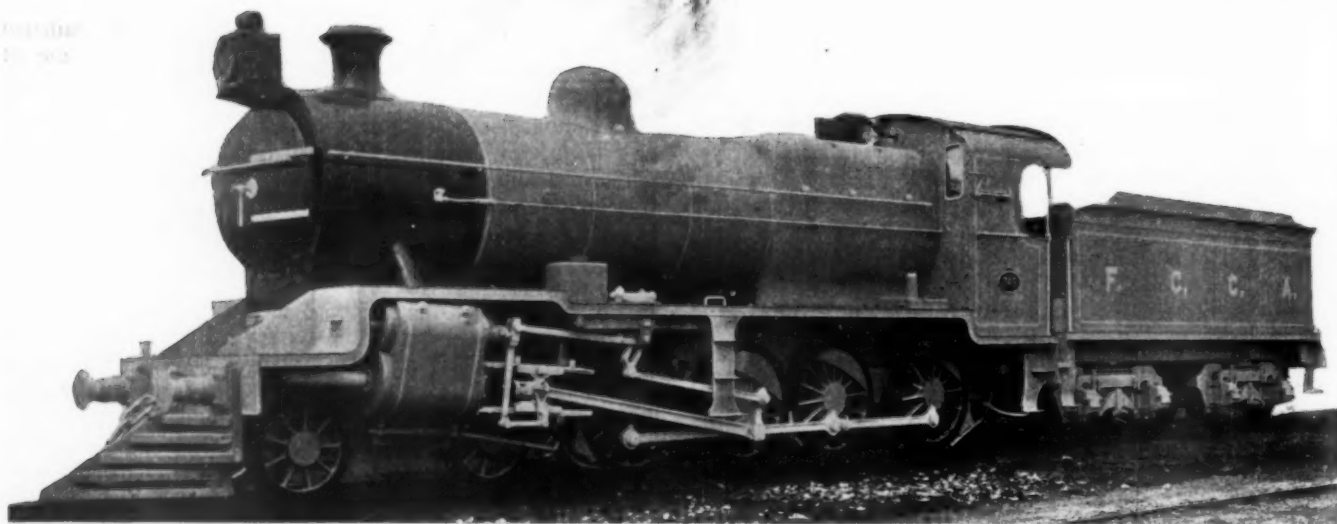


Volunteer Fire Department and Band at Bridge Repair Shop Near Bialystok

a gymnasium have been provided. There is a park in the community, and at the request of the town authorities the Railroad Y. M. C. A. has charge of providing a recreational program, including band concerts, etc. The only church in Lapy was destroyed by fire. The Y. M. C. A. came to the rescue and helped to put over the campaign to secure the necessary funds for rebuilding. It can very well be imagined what these things have meant in improving the conditions in the community and in building



Gasoline Rail Motor Car, South Australian Railways



A Freight Locomotive on the Central Argentine

Great Expansion in Argentina

State railways continue program and British-owned lines with good earnings renew activity

By George S. Brady
U. S. Trade Commissioner to Argentina

THE returns of the Argentine railways for the fiscal year ending June 30, 1924, show a complete recovery from the war depression, and the scope of the building plans of the principal lines for the coming year indicates the advent of another period of great rail-

standard and meter, but no great inconveniences are encountered from this difference because of the well organized grouping of the different gages, and the fact that each group has complete access to the chief ports and commercial centers. The meter-gage lines link up the whole northwest of the republic, and have access to Buenos Aires and the Pampas. The wide-gage systems, comprising 13,628 miles of 5 ft. 6 in. line, over the center and south of the country, reaching also as far north as the sugar districts of Tucuman. The standard-gage lines lie chiefly in the region between the Uruguay and Parana



American Electric Locomotive on the Buenos Aires Western

way expansion for the country. The chief railways of the republic are British-owned, and practically all of these lines paid dividends of 7 per cent for the year on their common stock besides allocating considerable sums for new rolling stock.

At the end of the year there were 22,839 miles of primary railroads in the country representing an investment of over a billion and a half of dollars, of which 70 per cent are foreign-owned and 18 per cent are the property of the state. These roads are of three gages: wide,



Grain Elevators Owned by the Buenos Aires Southern at Bahia Blanca

rivers and form the direct international connection between Buenos Aires and Asuncion, the capital of Paraguay.

The Argentine railways suffered greatly during and immediately following the war, not only from decreased traffic but also from the high operating costs and from the

difficulty of obtaining materials. Rolling stock was also allowed to fall into a bad state of repair. But both the equipment and the right of way have now been brought back to a state of efficiency and large additions have been recently made to the rolling stock. The increased traffic during 1924 has warranted the placing of large orders for cars and locomotives, and the double-tracking and rock-ballasting of some main lines. Total gross receipts for the year ended June 30, 1924, were 10 per cent higher than for the previous year, and judging by the returns for the four months from July 1 to October 31, 1924, the receipts for the year 1924-1925 will surpass the past year by another 10 per cent. The operating ratio, which in 1922 averaged about 75 per cent, has been cut down on all of the lines to figures between 60 and 65 per cent.

EARNINGS OF SEVERAL BRITISH-OWNED RAILWAYS IN THE YEAR 1923-1924.

Railway	Mileage	Receipts	Expenses	Dividend
Buenos Aires Southern.....	3,948	£10,859,175	£6,562,844	7%
Buenos Aires Pacific.....	3,362	9,130,939	5,869,682	7%
Buenos Aires Western.....	1,882	4,935,470	3,090,758	6%
Central Argentine.....	3,305	11,360,047	7,520,674	7%
Central Cordoba.....	1,205	3,168,602	2,317,971 (Not yet available)	

The last complete figures for the Argentine State Railways are for the year 1922, but the increasing prosperity of these lines is indicated by the fact that the gross receipts for six of these railways totaled 37,837,384 pesos* for the 10 months ending October 31, 1924, as compared with 34,837,384 pesos for the same period of 1923. These six lines had 3,926 miles in operation. A complete reorganization of the State Railways was effected during the year and a policy of greater economy and efficiency was begun.

Developments on the British-owned Lines

One of the most important of the Argentine railway systems is the British-owned Central Argentine, which has 3,305 miles of line in operation. It is the main passenger artery from Buenos Aires to the north of the republic, having through fast express train service to the important cities of Rosario, Santa Fe, Cordoba and Tucuman, with connections to the outlying regions. The Central Argentine Railway has the finest station in the Southern hemisphere at its terminal in Buenos Aires, and it now proposes to erect at once suitable passenger stations in the two cities of Rosario and Campana. The operation of the electrified suburban line from Buenos Aires to Tigre, which was completed in 1916, has been so successful that the electrification of the line from Buenos Aires to Villa Ballester is now under consideration. Suburban passenger traffic out of Buenos Aires on the lines of this company has risen from 15 million passengers in 1918 to 29 million in 1923.

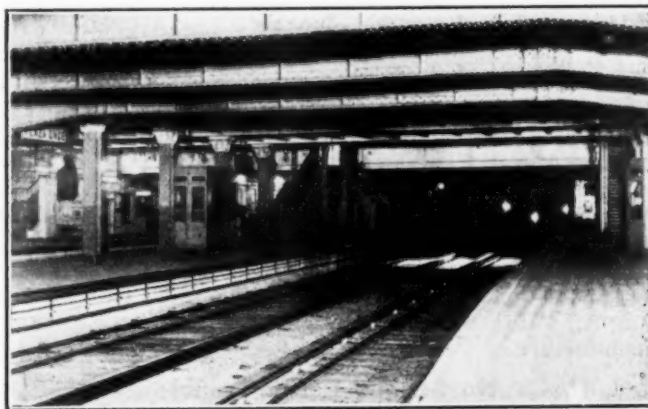
The directors of the Central Argentine have asked for a concession to construct a line from Villa del Rosario to the town of Garga. This extension, which will consist of about 250 miles of line, will cross an important zone of northern Cordoba, and will connect up two main trunk lines of the system. The company is also proceeding with the improvement of its right of way and with the acquisition of new rolling stock.

The Buenos Aires Southern Railway has probably the most ambitious plans for the immediate future. Its 3,948 miles of line cover the Argentine Pampas with a complete network, and by the acquisition of the Bahia Blanca Northwestern on November 1, 1924, it is adding another 764 miles, and extending its scope further westward. The continued improvements in the agricultural and livestock industries of the country during 1924 indicated an optimistic outlook for the affairs of the company.

At the end of the financial year 1924 the Buenos Aires Southern announced a program of extensions and im-

provements which would call for the expenditure of three million pounds sterling. The plans include a new line, 185 miles in length, from Azul to Dorrego. Other improvements include the four-tracking of the suburban line out of Buenos Aires and the ballasting of various sections. The taking over of the Galvan Port with the Bahia Blanca Northwestern places almost the entire port works of Bahia Blanca in the hands of this company.

The operation of the Buenos Aires Pacific for the year was considered very satisfactory considering the hard times which the line had passed through during the war period. The rolling stock, which was in bad condition, has been brought back to serviceable shape and fairly large orders have been placed for all-steel freight cars. An order has just been placed with Armstrong Whitworth for 12 express passenger locomotives of the 4-6-2 type for immediate delivery. The transfer of the Bahia Blanca Northwestern to the Southern will relieve the Pacific of a line which was somewhat out of its sphere of action. The Pacific System stretches due west of Buenos Aires to the foot of the Andes mountains and its



In the Buenos Aires Subway

main line is the direct route to the west coast of South America connecting at Mendoza with the Transandean Railway for Chile. The latter railway which has been operating independently since last year is now preparing to electrify its entire system.

Government Wants to Buy the Central Cordoba

The operation of the Central Cordoba for the year constitutes a record year of progress for the company. This meter-gage line has found difficulty in competing with the broad-gage railways but the intensive development of its immediate zone of influence and the betterment of its service has lately brought it to the front. This company has been asked to state under what conditions it would be prepared to transfer its lines to the State Railways. The latter are of the same gage and touch the Central Cordoba lines at several points. The acquisition of the Central Cordoba by the government would give the latter's lines access to the ports of Buenos Aires and Rosario.

Other Private Lines

The French-owned railways consist of 1,987 miles of meter-gage and 513 miles of wide-gage lines. Their receipts this year are well in advance of previous years and operating expenses have been decreased but they are more conservative as regards extensions. However the Santa Fe Railway has expressed a desire to construct the extension to the north from Resistencia for which it previously held a concession. It has requested the government for a renewal of this concession.

*An Argentine paper peso is worth about 40 cents U. S. currency.

The Meridiano Quinto Railway which is a meter-gage line owned and operated by the government of the Province of Buenos Aires has pushed forward its construction work on several extensions during the year. It has just received from a Swedish firm a shipment of 12 Pacific type locomotives and 6 switching locomotives as part of the new rolling stock required.

Government Lines Expanding Rapidly

The Argentine State Railways have an ambitious construction program covering a period of at least five years. Fourteen separate extensions are actually under construction, and the construction work is kept going at a moderate pace. About 6,000 men are engaged on the construction. These extensions will ink up the several parts of the meter gage lines in the north and will extend the Patagonian Railways to cover new regions in the far south.

The new Transandean Railway being constructed by the government from Salta to the Chilean border will eventually reach the port of Antofogasta on the coast of Chile, and will open up the rich Northern provinces of Argentina. The construction work on this railway is in charge of an American engineer. The Argentine part of the line, comprising 308 miles, will cost 50 million pesos. It is an engineering achievement ranking with the greatest railroad construction jobs of the world. At the highest point of the line the track reaches 14,520 ft. above sea level. The ascent has been accomplished without racks and with grades not exceeding 25 per thousand. At two points the line describes complete circles upon itself in ascending, and at another point five tiers of track are used to ascend the side of the valley. The first section of 44 miles of this railway was opened to traffic in August, 1924. Its rolling stock is entirely of American manufacture.

No Serious Labor Trouble

There have been no serious labor troubles in Argentina since 1920, and the railroads have been particularly free from strikes during 1924. Voluntary increases in salary have been given to employees to offset the increased cost of living, and because wages were recognized as having been low in many cases. The number of employees on the primary roads of Argentina is about 130,000 at the present time.

Europe Gets Equipment

Orders Because of Lower Prices

All of the orders for rolling stock placed by the British-owned railways during 1924 went to European manufac-

turers, chiefly due to lower prices. An important order for locomotives for the State Railways, however, was awarded to an American concern on the matter of quick delivery, although the American price was considerably higher than the offers of European manufacturers.

Orders for new equipment and supplies for the Argentine State Railways are ordinarily placed through public tenders. A purchasing department with a technical staff is maintained in Buenos Aires, which draws up specifications and awards the bids. All bids must be placed through houses having a legal domicile in Argentina, and it is usually a loss of time for American manufacturers to try to do business solely by mail. American firms in the past have been able to do considerable business



Southern Railway Station, Buenos Aires

with the State Railways, but the large orders have generally gone to firms with good representatives in Buenos Aires.

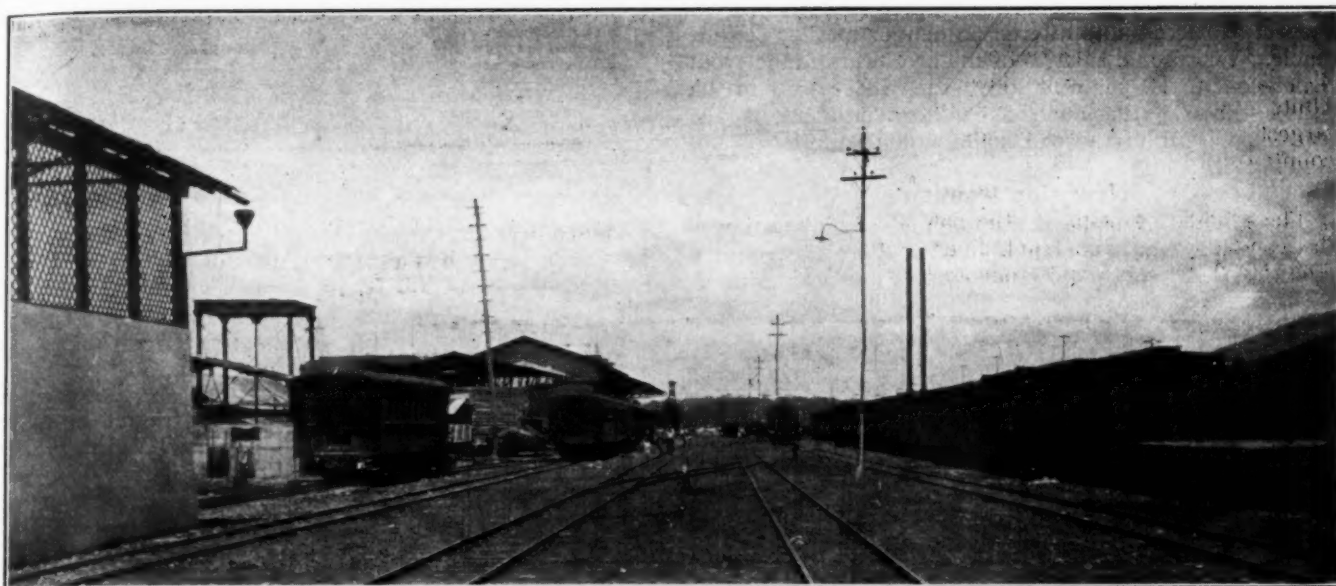
The European-owned railways recommend the purchase of equipment to their home offices in London or Paris, whence the calls for bids are made. The local storekeepers are authorized to purchase locally only small supplies or to meet an emergency from stock which is actually in Argentina. In such purchases no rebate for customs duties paid is received, and it is therefore not ordinarily advantageous to buy imported articles locally since the railroads are entitled to free customs entry on all materials. American manufacturers have, however, been able to place important orders for equipment and supplies at times by working through a good representative in Buenos Aires.



Building the New Trans-Andean Line, Toro Valley, Argentina

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Yards at Buenaventura, Pacifico Railway

Development Slow in Colombia

Construction costs and rates extremely high—U. S. indemnity used for railways

By Carlton Jackson

U. S. Commercial Attaché in Colombia

WHEN the Spaniards penetrated Colombia they followed the lines of least resistance in traveling and carrying their possessions. These lines were the four principal South-to-North rivers that flow into the Caribbean sea. The chief of these is the Magdalena, and until recent years by far the greater part of domestic traffic floated on it, and all the railroads were tributary to it.

For present purposes in the consideration of existing and prospective roads, only that part of the country may be taken that lies roughly North of the second degree of latitude and West of Bogota, containing all but an insignificant part of the population. The remainder is in the great selvas of the Orinoco and Amazon basins. This inhabited part is cut longitudinally by three high mountain ranges, springing from the great Andean knot at the Ecuador border and reaching northward nearly to the coast. Thus the topography of the country compels a North and South movement of commerce.

Between the Pacific Ocean and the western range are a narrow slope and a plain, economically unimportant as yet, and containing only one city of significance, the port of Buenaventura. Between the western and central ranges lie the Cauca river and valley, rich in minerals and agricultural possibilities. In its lower reaches that river is deflected to the East, and joins the Magdalena, the northern remainder of the basin being served by the Atrato river. The Magdalena valley lies between the central and eastern ranges, and provides transportation for the greater part of the productive territory of the republic. East of the eastern range, toward its northern end, is the rich and populous Department of North Santander, practically cut off from the rest of the country, and with its only commer-

cial outlet by way of Lake Maracaibo, in Venezuela.

It has become a firm principle in Colombia that the railroads must be owned and operated by the nation. Thus the Girardot Railroad, leading from the Upper Magdalena to the Bogota plateau, was bought in 1923 from the British company that had it; a lawsuit is pending to give the country the right to buy the Santa Marta road, and the government is now building several lines with the money from the American indemnity. The construction of a line from Bogota to Tunja by a Belgian syndicate was for a while delayed by the government, though the work is now proceeding.

The national treasury grants subsidies of from 15,000 to 25,000 pesos per kilometer to roads built by the departments or municipalities, payable after the work is finished, and the route and construction are approved by the government's engineers. The proposal of the Lorimer syndicate to build a standard-gauge trunk line from Bogota to Cartagena; while offering the realization of the country's greatest desire, apparently received no encouragement from the government, as the proposal carried the stipulation that the syndicate should hold and operate the road until it was paid for.

The personnel of the governmental and departmental roads is naturally native, with the exception of a few imported technical men. The foreign-owned roads, such as the Santa Marta, the La Dorada and the Cartagena, are managed by English and Americans, but have native train crews and other employees. Until recently labor troubles have been almost unknown; recently the Santa Marta Railway, said to be controlled by the United Fruit Company, was threatened with a strike, which would have had little

prospect of success and offered no danger of very serious trouble. Wages and salaries of minor officers range from 25 per cent to 50 per cent lower than those paid in the United States. Inasmuch as the government is the largest employer of railroad labor, union agitation is not countenanced.

New Construction

The guiding principle of the national administration is the completion of two trunk lines to bisect the country from North to South and from East to West, centering at



First Train to Be Operated into Zaral, Pacifico Railway, January, 1924

Bogota. Isolated construction is proceeding to that end. The East to West line is the more nearly accomplished, consisting mainly of the Pacifico road on the West, beginning at Buenaventura and reaching Cartago, in the valley between the western and central ranges. It lacks some 150 miles of reaching Ibagué, the western terminus of the Girardot-Tolima line; that line will soon be connected with the Girardot-Bogota system by the erection of a bridge over the Magdalena. This stretch of 150 miles has not yet been located, but in any case it will have to cross the great central range, reaching an altitude of 10,000 ft. or more. The East to West main line cannot be expected ever to be economical in operation, as it has to climb three high ranges.

The logical movement of commerce is from South to North, and such a route is being accomplished by the extension of the Northern Railway, out of Bogota, and the construction of the Puerto Wilches line. The latter is projected from the Magdalena river to Bucaramanga, but a part of it will form a link in the Bogota North coast trunk line. Both these roads are being built by the government, from the American indemnity. The present objective is limited to the construction of a road from Bogota to deep water on the Lower Magdalena, to eliminate the numerous and expensive transfers by rail and boat to reach points on the upper river.

New construction in 1924 was mainly carried on by the government. Lines laid were as follows:

Government-owned:	Kilometers
Pacifico, northern division.....	75
Pacifico, southern division.....	60
Extension of the Northern.....	40
Puerto Wilches-Bucaramanga.....	20
Tolima-Huila-Caqueta.....	22
Departmental roads, with subsidies from the government:	
Cundinamarca (Sabana).....	20
Caldas.....	18
Antioquia-Amagá, toward Cauca river.....	5
Bogota-Tunja (by Belgian syndicate).....	20

The construction of the Amagá road, from Medellín to the Cauca river, had reached such difficult ground (the descent of some 4,000 ft. to the valley) that a contract was given to an American firm, Winston Bros., to complete it for the distance of 40 kilometers remaining. It is stipulated that the work shall be finished in two years.

The greatest economic burden on Colombia is the high cost of transportation. Basic railroad freight rates run from six to twenty cents per ton-kilometer, the highest rates being the rule for imports. Coffee, which constitutes from two-thirds to three-fourths of the exports, is favored in the tariffs. On the Pacifico road the rate for it is six cents, on the Antioquia road ten, and on the La Dorada, eleven. The total cost per ton of freight from



Station at a Small Town on the Pacifico Line

Bogota or Medellín, the largest commercial centers, to seaboard, ranges from \$60 to \$75, and that for imports sometimes runs higher.

This high cost is due to the fact that all the roads are narrow-gage, and except those paralleling the rivers, consist of successions of steep grades and short curves. On these lines a train-load of 60 or 70 tons in the limit. Little is being done to correct these difficulties; in the nature of the ground not much is possible. The Antioquia road, from Medellín to the Magdalena river, is the best equipped and operated line in the country, but the departmental government realizes that it can never be operated economically, and it is resolved to build a line North to Cartagena, following the Cauca valley. On such a line it is expected that a rate of two or three cents a ton-kilometer may be made.

Railways of Columbia	1924		1922					Net revenue
	Length kms.	Gage meters	Passengers	Freight metric tons	Freight rate per ton-kilometer		Gross revenue	
					Export	Import		
Amagá	57	0.91	853,108	59,115	10c	12c	\$291,961	\$149,270
Antioquia	190	0.91	1,662,943	121,682	10c	24c	1,506,608	796,505
Barranquilla	28	1.07	223,952	174,638	9c	15c	722,318	221,950
Caldas	71	0.91	213,780	17,337	12.5c	24c	162,930	70,031
Cartagena	105	0.91	28,751	38,380	4c	7½c	291,454	4,338
Cocuta	72	1.00	223,326	31,463	...	...	353,717	78,928
Cundinamarca	75	1.00	1,140,012	137,813	11c	11c	486,773	181,105
Girardot	132	0.91	258,303	116,777	11c	11c	1,177,223	\$17,397
Huila Caquetá	27	0.91	45,384	1,333	...	...	13,238	.....
La Dorada	111	0.91	181,486	84,261	10c	10c	708,843	251,541
Norte, and Extension	97	1.00	873,487	103,195	6c	6c	528,600	280,477
Pacifico	450	0.91	369,192	100,724	5c	16c	1,122,172	304,760
Puerto Wilches	40	1.00	16,519	4,640	...	...	38,379	3,438
Santa Marta	159	0.91	431,193	60,609	...	...	887,399	.....
Sur	35	1.00	266,464	59,849	...	...	162,426	27,778
Tolima	76	0.91	184,019	17,435	10c	12c	200,176	17,416
Totals	1,725	...	6,971,919	1,129,321	...	...	\$8,654,223	\$2,904,940
Mariquita-Manizales Cable-way	72	...	.....	19,000	...	...	\$324,000	\$122,000

NOTE—The manager of the Pacifico road stated that the total investment in that line to June 30, 1924, has been approximately 21,000,000 pesos.



Da Luz Station, São Paulo

Brazil Needs More Railways

Many lines not paying—Traffic congestion acute in richest state, Sao Paulo

By D. L. Derrom

BRAZIL, greater in area than the United States, (without Alaska), with 30,000,000 people, 18,142 miles of railways and an enormous wealth of untouched land, forest and natural resources of all kinds, stands today on the threshold of a

The fact that these problems are no further toward solution than they are is largely due to the economic effects of the war and the extremely rapid development of the country. Railway construction is more or less at a standstill, while all roads are extremely short of locomotives rolling stock and other equipment. Great increases in the cost of living and labor, coupled with prohibitive exchange rates, have postponed maintenance and improvement programs until the situation in some instances is acute.

Brazil's Problem

Railroad officers have been confronted with the problem of moving ever increasing business with the equipment on hand or with very little additional and with maintaining their equipment on a very narrow margin.

Brazil has no coal, or at least none of any present importance, and locomotives burn either firewood or imported coal, another tremendous item of expense and daily becoming more serious. Water power, on the other hand, is plentiful, and one railway, the Paulista, has already electrified part of its line to great economic advantage and is now converting another section, about 60 miles in all. Labor appears to be quiet and while scarce in some districts, the situation in general can be considered good.

The financial situation of the roads in general, with the exception of some roads in São Paulo, cannot be called good, due to the economic conditions already indicated and the delayed improvement and maintenance programs. The Sorocabana, owned by the state of São Paulo, has



Old (Left) and New Lines (Right), São Paulo Railway

development capable of eclipsing that of any other country save the United States and one which depends largely upon the solution of transport problems.

recently been enabled to buy some additional equipment and it is rumored that considerable additional capital is to be provided for equipment and double tracking.

American Practice Followed

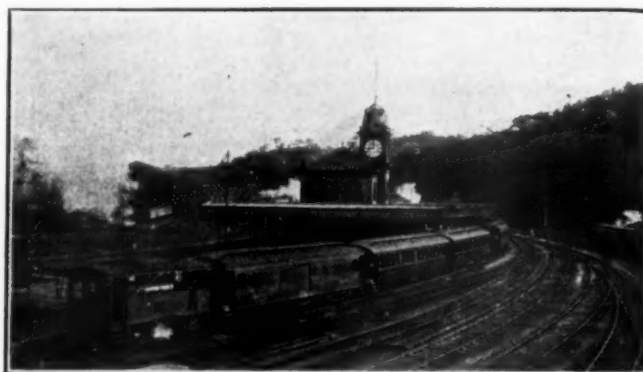
The general tendency of the more important roads of the country is to follow the American practice of increasing train loading by the adoption of heavier locomotives and cars, this tendency being counteracted by lightness of rails, bridges, etc., and the difficulty of obtaining capital for such betterments.

Electrification is bound to have a big future in Brazil's railway development, due to the shortage of fuel and the abundance of water power. Projects are in hand for electrifying the Central of Brazil, out of Rio de Janeiro, and all other roads are carefully observing the experiment of the Paulista.

Prior to the war comparatively little American equipment was used by the railways of Brazil. During the war, however, and until about two years ago, America was about the only source of supply; but now conditions are rapidly reverting to the pre-war basis and Belgian and German materials are again taking the field. This condition will

São Paulo has the greatest railway mileage of any Brazilian state—4,500 miles, 1,400 miles of which are owned by the state and federal governments. The railways in this state are the only ones in Brazil that earn a surplus. Coffee no longer furnishes the greatest volume of traffic, industrial and agricultural expansion have revolutionized the situation and where ten years ago coffee formed 75 per cent of freight hauled, today it is a bare 25 per cent.

The revenues of the state of São Paulo were greater than that of any of the states in the United States with



At the Top of the Inclined Planes, São Paulo Railway, Showing Train and Grip Car

TABLE I

PRINCIPAL RAILWAY COMPANIES OF BRAZIL, WITH THEIR APPROXIMATE MILEAGE, STATES OPERATED IN, GAGE, OWNERSHIP AND OPERATION

S. O. = State-owned. S. Op. = State-operated. F. O. = Federal-owned. F. Op. = Federal-operated. P. O. = Private-owned. P. Op. = Private-operated. S. L. = State-leased and operated.

Name of Railway	Mileage	States Operated in	Ownership and Operation	Gage
Araraquara	143	São Paulo	S.O., S. Op.	1 meter
S. Paulo	150	São Paulo	P.O., P. Op.	1.61 meter
Paulista	800	São Paulo	P.O., P. Op.	1 meter
Dourado	130	São Paulo	P.O., P. Op.	1.61 meter
Noroeste do Brasil	800	S.P. e Matto Gros.	P.O., F. Op.	1 meter
S. Paulo-Goyaz	50	S.P.-Goyaz	P.O., P. Op.	1 meter
Sorocabana	1,015	S.P.-Paraná	S.O., S. Op.	1 meter
Mogyana	1,200	S.P.-Minas	P.O., P. Op.	1 meter
Sul-Mineira	762	Minas-S.P.	F.O., F. Op.	1 meter
Central do Brasil	1,450	Rio, Minas-S.P.	F.O., F. Op.	1.6 meter
Rio d'Ouro	80	Rio de Janeiro	F.O., F. Op.	1 meter
Oeste de Minas	1,245	Rio-Minas	F.O., F. Op.	.76 meter
Goyaz	300	Minas-Goyaz	F.O., F. Op.	1 meter
Victoria-Minas	370	Esp. Santo-Minas	P.O., F. Op.	1 meter
Leopoldina	1,923	Rio, Minas-Esp. Sto.	P.O., P. Op.	1 meter
S. Paulo - Rio Grande	1,200	Paraná - Sta. Catharina	F.S., O.P. Op.	1 meter
Madeira Mamore	230	Amazonas	F.O., F. Op.	1 meter
Bahia	1,950	Bahia-Minas	F.O., P. Op.	1.61 meter
Great Western	922	Alagoas, Parnahyba-Pernambuco	F.O., P. Op.	1 meter
Central do R. G. do Norte	100	Rio Grande Norte	F.O., P. Op.	1 meter
Ceará-Piahy	490	Ceará-Piahy	F.O., P. Op.	1 meter
Rio Grande Sul	1,450	R. Grande do Sul	F.O., S.L.	1 meter

likely continue until European and American prices become harmonious. However, whatever the source of supply of equipment, American railway methods will always predominate and American supply houses will have no difficulty in obtaining the lion's share of business when prices are anything near the European.

The railways of the country may be divided into three general categories, viz., (1) federal-owned and operated, (2) state-owned and operated and (3) private-owned and operated, while some combinations of these classes exist. Table I gives a general idea of the situation indicating the names of the principal railway companies, their mileage, state they operate in, ownership, operation and gage.

For Americans, and especially those interested in railways, their activities and supplies, the Southern or temperate and progressive, zone of Brazil presents the point of greatest interest, and of this part the state of São Paulo is foremost. Brazil is a federation of twenty states, of which São Paulo is by far the richest, most progressive and important—and to a degree little appreciated by the outside world, especially in America.

the exception of Massachusetts, New York and Pennsylvania. It contributes more than half the entire revenue of the Brazilian federal government. In 1919 the imports of São Paulo were valued at \$95,253,697, and the exports at \$271,866,500—which last figure was equivalent to the value of the exports of all the other Brazilian states. We have, therefore, sufficient convincing evidence that when

TABLE II

TABLE COMPARING AREA, POPULATION, RAILWAY MILEAGE AND STATE REVENUES OF THE VARIOUS STATES OF BRAZIL (1919)

State	Area, sq. miles	Population	Miles Rys. in operation	State revenue, 1919
Piahy	114,652	615,000	16	\$512,500
Goyaz	359,978	520,000	90	731,250
Maranhão	173,755	890,000	250	1,186,000
Parahyba	28,407	975,000	200	1,227,000
Matto Grosso	523,937	255,000	725	1,391,000
R. Grande do Norte	21,844	545,000	200	1,419,500
Sergipe	11,434	485,000	190	1,478,500
Alagoas	22,226	935,000	200	1,478,350
Ceará	36,615	1,360,000	685	1,598,600
Santa Catharina	17,303	675,000	500	1,814,300
Amazonas	719,995	370,000	150	1,840,000
Paraná	95,717	695,000	690	2,154,400
Espirito Santo	18,038	465,000	625	2,504,400
Pará	436,814	995,000	252	2,243,000
Pernambuco	48,780	2,160,000	560	5,270,000
Rio de Janeiro	26,214	1,570,000	2,000	6,125,000
Rio Grande do Sul	89,975	2,220,000	1,250	7,374,500
Bahia	161,041	3,360,000	1,140	9,024,400
Federal District	544	1,170,000	...	12,520,000
Minas Geraes	208,185	5,940,000	4,100	12,909,900
São Paulo	110,532	4,650,000	4,500	28,861,700

*Included.

considering Brazil from a railwayman's point of view São Paulo's problems deserve first attention.

The railway system of São Paulo serves not only the state itself but a vast area comprising practically all of the state of Matto Grosso and large parts of Goyaz, Minas and Paraná, each of them an empire in itself. It is true that as yet great parts of these areas are only partly settled and developed but nevertheless their future depends upon transport and therefore upon the solution of São Paulo's problem. An examination of Table II, with areas, populations, etc., will fix this situation more clearly in the reader's mind. All the important railways of the state converge upon the city of São Paulo or to railways that eventually do so. Only one important seaport is connected

with this vast system—Santos—and that connection is established by a single railway crossing a heavy mountain range.

This short line, known as the São Paulo Railway, owned by an English company (with board of directors in London), is the controlling factor of this important transport system and a brief study of its method of construction and



Head of Inclined Plane, Showing Trains, Cable Rollers, Signal Tower and Power Station for Haulage Plant

operation will indicate how serious the situation is and the imperative need of immediate relief. For some time the docks at Santos have been congested and business in general throughout the city and state seriously handicapped by lack of transportation; passenger traffic between Santos and São Paulo is steadily increasing, adding still further to the difficulties of the situation.

Proceeding inwards from the coast at Santos a low-lying narrow coastal plain is encountered from which rises abruptly a barrier in the form of a mountain range called the Serra do Mar, varying in height from 2,600 to 2,800 ft. Over this range is a gradually inclined plateau extending to the drainage system of the Paraná and La Plata rivers, which drain westward and southward into Argentina. The city of São Paulo (elevation 2,500 ft.) is situated on this plateau some 50 miles inland from Santos and 34 miles from the summit of the coastal range (elevation 2,600 ft.). To reach São Paulo in a direct line a rise of this height must be made in a distance of some six miles.

The São Paulo Railway

The English engineers who were confronted with this problem in 1865 solved it by adopting a combined inclined plane and rope haulage system, using originally an arrangement of four inclined planes in the five miles of ascent, rising in this distance some 2,600 ft. with grades of 11 per cent. Steam-driven haulage engines of 150 h.p. and a rope of 1.3 in. diameter were used.

About the year 1896 the line became overtaxed and the harbor at Santos so congested that a decision was made to relieve the situation by constructing another line on the same principle, using haulage engines of 1,000 h.p. and rope of 108 tons' breaking strength.

Each incline is operated independently. A grip car attached to each train is equipped with devices for picking up and gripping the cable and is fitted with powerful brakes, including an ordinary track brake. The five inclines, each with a separate hauling plant, work continuously, there being always five trains ascending and five descending, one balancing the other. The maximum gross weight of trains is 145 tons—net 78 tons. The train is composed of six freight cars of about 15 tons' capacity each and a grip car of 31 tons weight. The time necessary to operate over an incline is from 8 to 10 minutes. Theoretically there can be from 400 to 500 tons an hour delivered to top and bottom

—actually the result is somewhat less. The cost of construction of this railway, including the entire line from Santos to Jundiahy, its inland terminal, is said to be \$35,000,000, or \$407,000 per mile!

We have, then, an enormous bottle with its base way back in Matto Grosso and Goyaz and its neck the São Paulo Railway, leading to the coast. And this railway is so constructed that its capacity cannot be increased without radical changes and enormous expenditures. Its system of operation is expensive in the extreme and far from the modern idea of moving heavy tonnage. Any improvement to this railway, therefore, simply puts off the inevitable solution, as was done in 1896 by the construction of the new line.

Solutions Proposed

The concession of the São Paulo Railway Company terminates in 1927 and the problem before the state and federal authorities and the business men of São Paulo is to bring about the adoption of the best of a number of proposals to relieve the congestion.

Whatever the solution is, it must be one where standard modern trains can be hauled and of a cost of construction and operation that will tend to reduce rather than increase rates which are already excessive.

Surveys have been made for additional lines—one from Mayrink on the Sorocabana Railway through the mountains south of the city of São Paulo to Santos; another to run from Campinas on the Paulista Railway to Mogy das Cruzes on the Central do Brazil to the north of São Paulo and thence to a new port called São Sebastian, about 80



Power House at Head of Inclined Plane

miles north of Santos, where nature has provided an excellent harbor and a large shipping point can be created without the difficulties existing in Santos. It is said that this line can be built with maximum grades of 1.8 per cent.

It would be contrary to good policy for the state to take over the operation of the São Paulo Railway in 1927 and by so doing further delay a sensible solution of the situation. The concession should be renewed and under such conditions as would enable the company to continue to operate and improve, but the imperative need of a new line cannot be overlooked if São Paulo is to expand at a rate justified by the existing circumstances.

The line by way of Mayrink and the Sorocabana is long and expensive to build and operate—and not strategically situated. The line from Mogy das Cruzes to São Sebastian, however, would have the advantage of relieving the congestion in Santos and on the São Paulo Railway and of developing a new and up-to-date port with deep water for modern liners justified by the vision of São Paulo's future expansion. It should be possible to construct and operate it at a cost to permit of tonnages and rates consistent with modern ideas.



Tama-gawa Bridge, Atami Line, After the Earthquake

Japan Relegating Quake to History

*Permanent restoration work well in hand—Electrification
and new construction progressing*

RAILWAY endeavor in Japan during the past year has been concentrated principally on restoration of track and structures damaged or destroyed by the great earthquake of September, 1923. Damage to railway property by this earthquake totaled about 34,500,000 yen.* This includes the property damaged but not the further losses caused by the losses in revenues

when traffic fell off. However, the railway administration purposes to build all structures more solidly than formerly, so that a total expenditure of 50,000,000 yen is contemplated for restoration work which will extend up to and including 1926. The new construction program of the railways calls for an expenditure of an additional 75,000,000 yen up to and including 1928.

The Imperial Japanese Government railways in the

* Yen=49.8 cents at par; now worth about 39 cents.



Tama-gawa Bridge Today

fiscal year 1923 had gross revenues of 448,266,091 yen. Operating expenses were 328,479,055 yen, leaving an operating net of 119,919,036 yen. A substantial portion of this net will be spent for capital account.

Estimated gross revenues for the fiscal year which will end on March 31, 1925, are 493,459,998 yen and expenses 362,508,998 yen, leaving a surplus of 130,951,000 yen.



Nenoueyama Tunnel Immediately After the Quake

Traffic on the railways has shown satisfactory increases over the previous year during every month of 1924, as is shown in Table I.

Restoration Work

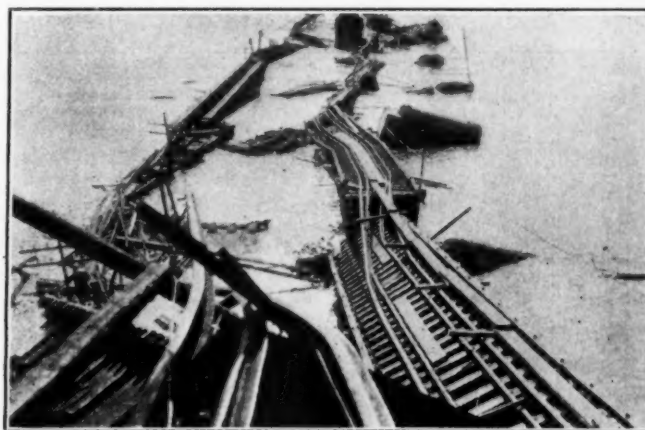
The total amount of earthquake damage on the railways is shown in Table II. Emergency reconstruction was immediately undertaken so that most lines were back



Nenoueyama Tunnel Today Changed to Open Cut

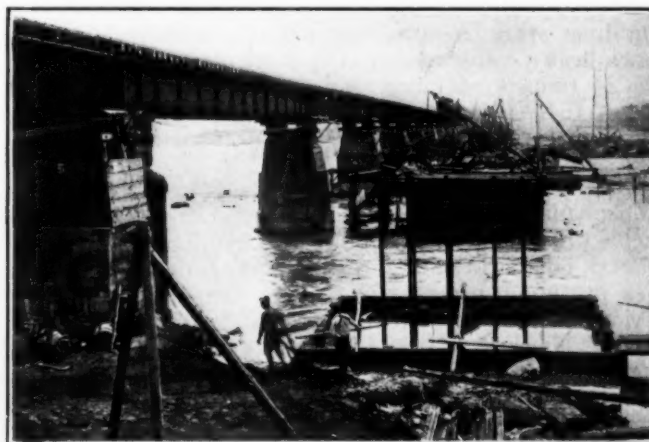
in service a few weeks after the earthquake. Permanent reconstruction, however, has necessarily had to proceed more slowly. Emergency work was done for the

most part where the tracks previously lay, but in some cases it was necessary to build temporary tracks around an obstruction. In the repair of bridges, steel girders of damaged structures were largely used, although it was found necessary in a number of cases to take undamaged



Banyu Bridge Immediately After the Quake

girders from structures on unimportant lines to restore speedily to service main line structures. Temporary piers and abutments were made of wood. Bent rails were used to support cracked tunnel linings. In the case of fallen embankments it was necessary in a number of cases to



Banyu Bridge Restored

change the maximum grade as, for instance, from 1 per cent to 1.5 per cent. In the permanent reconstruction work the lines will be built in the main essentially where they were before the quake, although on some 40 sections a change in track location has been advised. The permanent restoration work is about one-third completed.

TABLE I—REVENUE AND VOLUME OF TRAFFIC—JANUARY TO OCTOBER, 1924

Month	Average miles operated		Number of passengers		Tonnage of freight		Passenger traffic revenue		Freight traffic revenue		Total revenue		Average revenue per day per mile.
	1924	Increase over 1923	1924	Increase over 1923	1924	Increase or decrease over 1923	1924	Increase over 1923	1924	Increase over 1923	1924	Increase over 1923	
January	7,247	262	48,738,519	10,530,291	4,959,257	463,535	20,839,628	3,621,358	14,547,777	1,600,495	35,387,405	5,221,853	158
February	7,251	264	41,576,254	9,418,593	4,961,957	382,389	18,817,096	3,315,548	14,941,749	1,534,204	33,758,845	4,849,752	161
March	7,277	282	46,466,960	5,073,502	5,789,708	375,637	23,441,856	2,125,860	17,341,987	1,145,272	40,783,843	3,271,132	181
April	7,348	310	104,671,608	13,205,206	5,643,441	451,607	28,788,448	1,914,227	16,851,898	1,321,269	45,640,346	3,235,496	207
May	7,366	310	54,145,047	8,756,455	5,658,453	255,780	24,164,820	2,013,578	16,663,741	701,516	40,828,561	2,715,094	179
June	7,370	303	42,843,218	6,649,565	5,219,378	181,318	19,166,787	1,831,502	15,486,281	582,928	34,653,068	2,414,430	157
July	7,387	312	44,833,150	5,166,265	5,081,879	347,607	20,221,241	1,013,775	14,822,364	853,028	35,043,605	1,866,803	153
August	7,415	332	46,121,179	4,331,441	4,751,517	*45,863	23,681,666	1,057,009	14,369,167	93,903	38,050,833	1,150,912	166
September	7,416	296	51,209,636	20,283,252	5,155,631	1,386,284	20,029,845	3,868,438	15,889,758	5,992,956	35,919,603	9,861,394	161
October	7,430	283	52,744,708	1,888,481	5,508,038	767,290	23,113,306	809,937	17,039,308	4,042,344	40,152,614	4,852,281	174
Total	.....	.....	533,350,279	85,303,051	52,729,259	4,565,584	222,264,693	21,571,232	157,954,030	17,867,915	380,218,723	39,439,147	...

*Decrease.

The new construction program of the railways contemplates 87 new lines, totalling 3,562 miles. Up to the end of October, 1924, 525 miles of line had been completed and opened for traffic and 557 miles were under construction, about 165 miles of which were completed by the end of the year. Of the work in hand, contracts



Kan-nomeyama Tunnel, Atami Line, Immediately After the Quake

calling for an expenditure of 24,710,000 yen have been placed with outside concerns, while work to cost 40,530,000 yen is being done directly by the Railway Department. It is expected that this entire program will be completed within the next ten years or so. Most of the new lines are in mountainous districts, which will necessitate heavy construction. On work now in hand there are 24 tunnels of more than 2,000 ft. in length (total length 154,900 ft.) and 74 bridges (totalling 33,600 ft.).

Electrification

The following lines are electrified: Tokyo-Sakuragicho (Yokohama), 19.2 miles; Shinagawa-Ueno, 15.0 miles; Ikebukuro-Akabane, 3.5 miles; Tokyo-Kokubunji, 19.5 miles. This is in addition to a short section (6.7 miles) of a maximum gradient of 6.6 per cent on the Shinetsu line where the Abt system is used. Electrification on the Tokyo-Odawara section (52.1 miles) and Ofuna-Yokosuga section (10 miles) of the Tokaido line is being carried on with the utmost dispatch so that the work on these sections is expected to be completed by March, 1925. In addition to this, electrification for the following lines has received the approval of the Imperial Diet:

Section	Miles
Odawara-Akashi	326.2 (double track)
Ueno-Omiya	16.6 (four track)
Kokubunji-Hachioji	9.9 (double track)
Manseibashi-Ryogokubashi	1.7 (" ")
Ryogokubashi-Chiba	22.7 (" ")
Naruto Line (Osaka-Minatomachi)	8.9 (" ")
Katamachi Line (Katamachi Shijonawate)	8.2 (single track)

In addition, studies are being carried on concerning the advisability of electrifying 3,000 additional miles of

TABLE II—EXTENT OF EARTHQUAKE DAMAGES ON JAPANESE RAILWAYS

Mileage of damaged track	418 miles
Length of damaged embankments	45 miles
Landslides in cuts	33,000 cubic <i>tsubo</i> *
Falling of stone work in cuts	2,500 <i>tsubo</i> *
Number of damaged bridges	223
Of which:	
{ Number of falling girders	12
{ Total length of damage	7,250 feet
Total length of damaged or collapsed tunnels	1,000 feet
Number of stations damaged to considerable extent	75

*A *tsubo* is equivalent to practically 4 sq. yd. A cubic *tsubo* would be, therefore, practically 8 cu. yd.

line. On the sections in Tokyo and its environs which were damaged by the earthquake it has been decided to complete electrification in connection with the restoration work.

[The *Railway Age* is indebted to the Imperial Japa-

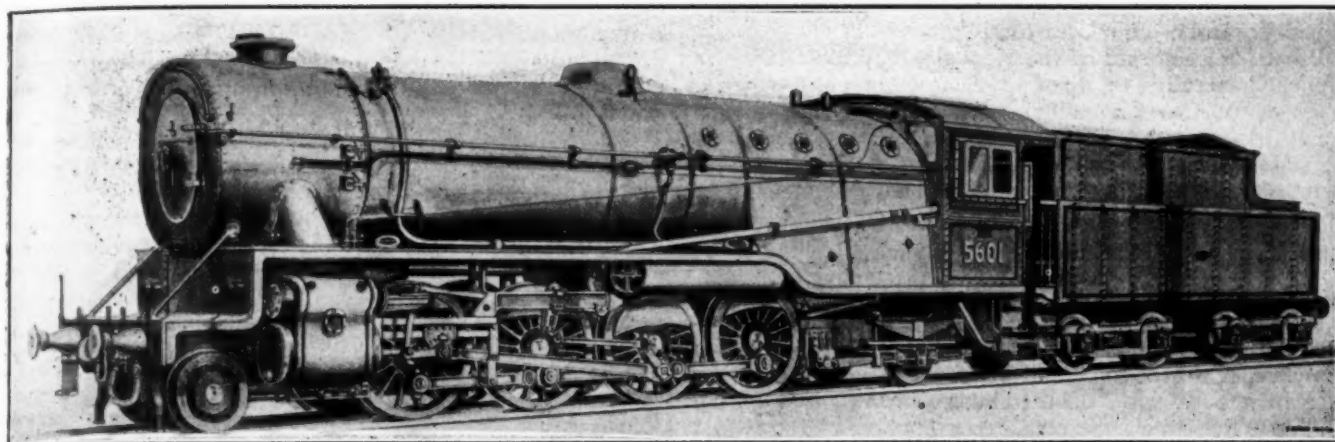


Kan-nomeyama Tunnel in October, 1924

nese Government Railways, and in particular to Messrs. N. Toda, M. Y. Inomata and Iwao Koyama, for securing for it valuable and extensive data on the railway situation in Japan. On this information the present article was based, and from it other articles will be prepared to appear in subsequent issues.—The Editor.]



Freight Yard Near Vienna, Austria



Proposed Mikado Type Locomotive for the N. S. W. Railways

Australian Railways Doing Well

*Experts from England advocate less legislative interference
—American practice being adopted*

By W. H. Newman

Information Officer New South Wales Government Railways

THE outstanding railway event in 1924 has been the appointment of a Royal Commission of Inquiry into the management and operation of the New South Wales Government Railways—the largest railway system in Australia.

The railways of Australia, with one or two minor ex-

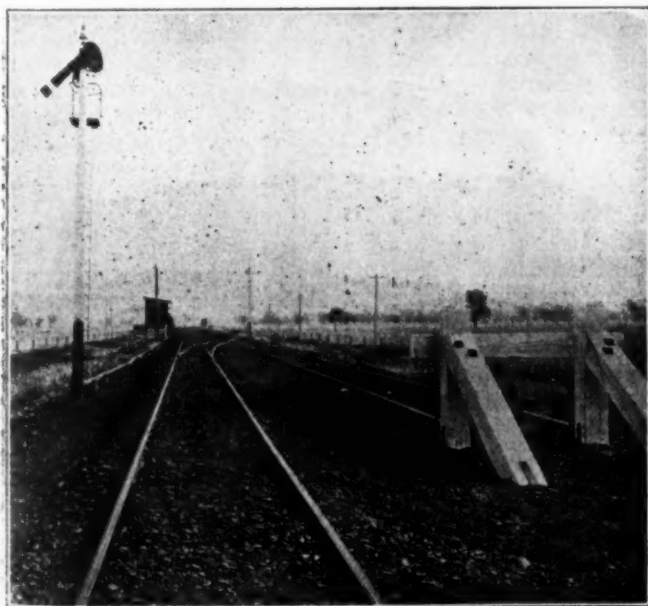
average member of any democratic assembly, however honest personally, is constantly finding himself pressed to vote in connection with railway matters in the interests of his own constituents or of one class of the community rather than in the interests of the railways and the state as a whole. In short, politicians as a body are constantly being forced to do things opposed to efficiency on state railways.

The decision, therefore, of the New South Wales government to appoint a Royal Commission of Inquiry, consisting of two eminent English railway experts (Sir Sam Fay and Sir Vincent Raven) was regarded with general satisfaction by the whole of the railways of Australia. It was felt that at last railway operation and management were to be criticized by gentlemen who were authorities on railway work.

Experts Recommend Less Legislative Interference

The report of the Royal Commission was a complete vindication of the present administration, but the English experts made many pointed comments on the disabilities under which railway operation is performed owing to the interference by Parliament in the management.

The English experts found, to use their own words, that "the railway system of New South Wales is a great and valuable asset, whether measured as a revenue-producing machine, or as the principal agency in the rapid development of the country. Despite certain deficiencies to which we call attention, it reflects credit upon those who have been responsible for its management. It is capable, under good administration, of producing large net revenues and of providing cheap, speedy and adequate transport throughout the state. On the other hand, in the absence of immediate necessary and far-seeing system of finance, it may become ineffective as a developmental agency, as well as a serious burden to the state. We are unable to suggest a satisfactory solution of the disabilities suffered by the railway commissioners apart from taking



Typical Passing Siding ("Unattended Crossing Loop") in Australia

ceptions, are state-owned, and are managed by railway commissioners appointed by the legislatures of the various states. Being so owned they are subjected to a great deal of criticism in the various legislative bodies. The

finance out of treasury hands and giving the commissioners control of their own funds."

What has been said of the New South Wales Railways applies generally to the other governmentally-owned railways of Australia. Each of them is dependent on a yearly parliamentary budget and this does not permit of the state railways being financed economically, nor enable them to render that service to the community of which they would otherwise be capable.

State Ownership Believed to Be Necessary

With Sparse Population and Traffic

It must not, however, be assumed that the state ownership of railways in Australia has been a failure. From many years' experience, and from an intimate acquaintance of the working of the Australian railways in the whole of the states, the considered opinion of those best able to judge is that, taking into consideration that the governments were the owners of the land principally to be developed and settled, and that settlement could not be effectively carried out without means of transport, the interest of the public has been best suited and preserved by the state-owned railways.

Private enterprise, even if all the necessary capital were available, would not have built the pioneer lines which the states have constructed into desirable but comparatively distant sections of the country—pioneer lines that are so essential to the development of a young country. These lines have to pass through a relatively unproductive period before they can possibly begin to pay. Such is the condition of a lot of the lines in Australia today, and these propositions are not as a rule attractive to the private investor.

In dealing with the Australian railways, it must not be lost sight of that the area of the mainland is greater than the United States by an area of that of New Hampshire and New Jersey combined. In 1923, however, Australia had a population of less than 6,000,000 people, and these two factors—huge area and relatively small population—make the problem of Australian railway operation particularly difficult.

The total mileage of railway line open for traffic in the Commonwealth is approximately 25,000, of which 6,580 miles are of standard gage, 5,560 miles of 5 ft. 3 in. gage, 12,285 miles of 3 ft. 6 in. gage, and 175 miles of 2 ft. 6 in. and smaller gages.

The six states of the Commonwealth of Australia built their railways independently and without regard to interchange of traffic. The extra cost, delay and inconvenience occasioned by the necessity of transferring through passengers and freight at places where there are breaks of gage are becoming more serious year by year, as the volume of business increases.

It has been decided to adopt the 4 ft. 8½ in. gage as standard throughout the Commonwealth, but the immediate commencement of this necessary work has been deferred owing to lack of funds. However, the Federal government and the governments of the states of New South Wales and Queensland are fully alive to the necessity of unification of gage, and a recent agreement has been arrived at to build a connecting line from Kyogle on the North Coast district of New South Wales to the capital of Queensland (Brisbane)—a distance of 100 miles of standard gage, the federal government and the governments of the two states bearing the cost of construction.

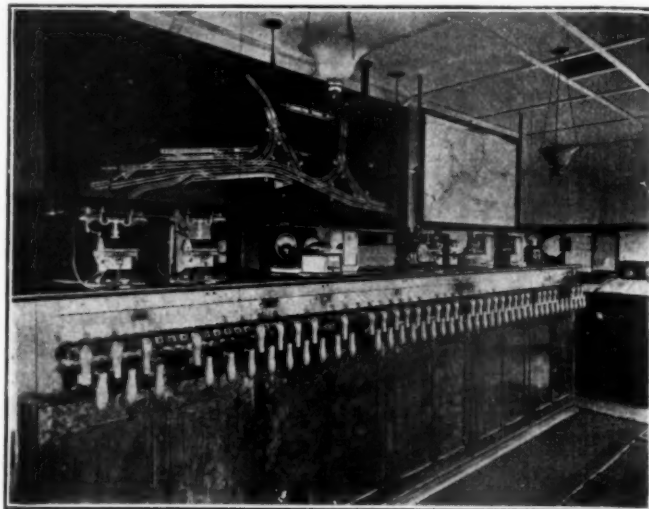
New Construction

During the year the State of Queensland opened for traffic 133 miles of 3 ft. 6 in. gage line, making the total mileage in operation in that state 6,040 miles. New South Wales constructed and opened to traffic 205 miles

of standard gage line, and this state now has in operation a total route mileage of 5,523. The Victorian Railways are all practically 5 ft. 3 in. gage, and 57 miles were opened in 1924, making the total mileage open for traffic 4,369 miles.

South Australia has now open for traffic a mileage of 2,452 of which 1,191 miles is 5 ft. 3 in. and 1,261 miles 3 ft. 6 in. gage. During the year 27 miles of 5 ft. 3 in. track and 62 miles of 3 ft. 6 in. track were brought into use. In Western Australia the new mileage constructed and opened during the year amounted to 36, all of which was 3 ft. 6 in. gage. Western Australia has at present in use a total of 3,629 miles of this gage.

No new construction took place in Tasmania during



Typical Electric Interlocking in Australia

the year, the mileage of line operated being 663 miles, 638 miles of which is 3 ft. 6 in. gage and 25 miles of 2 ft. 6 in. gage.

The federal government operates the Transcontinental Railway between Kalgoorlie in Western Australia and Port Augusta in South Australia, a distance of 1,052 miles, standard gage. It also owns and operates the line from Darwin, in the Northern Territory, to Katherine river, a distance of 199 miles, gage 3 ft. 6 in. No new line construction took place under the federal government during the year.

In the southwestern portion of New South Wales there are many millions of acres of fine land which, owing to the long haulage involved, have no connection to the main New South Wales Railways. The towns lying in this area are much closer to Melbourne than they are to Sydney, and an agreement has now been entered into by the governments of the two states whereby Victoria is empowered to construct and operate four lines of railway into New South Wales territory, which will be linked up with the main Victorian system. This will mean the construction of over 200 miles of line, and the consequent development of these rich provinces should confer far-reaching benefits upon both states.

New Locomotives and Rail Motor Cars

To cope with the ever increasing traffic, and with a desire to take full advantage of the economies that can be effected by improved and more powerful locomotive stock, most the Australian systems have made arrangements for a supply of up-to-date locomotives.

New South Wales has completed a contract with a local firm for the supply of 35 locomotives, the first delivery to be early in 1925. These locomotives have a tractive effort of 30,500 lb., and with a tender of improved

design it is expected that much longer runs may be accomplished than at present.

While these new locomotives will improve the present passenger stock, it is recognized that at no far distant date larger and more modern types will be required for both passenger and freight. Plans of standard types have already been completed of a Pacific and a Mikado, with a tract effort of 38,000 lb. and 45,200 lb. respectively. The South Australian program includes the purchase of ten Pacific type (tractive effort 36,600 lb.), ten Mountain type (tractive effort 51,000 lb.), and ten Mikado type (tractive effort 40,400 lb.).

Victoria is building ten Mikado type locomotives. They will be so constructed as to permit of being converted with a minimum of expense to standard gage when the necessity arises.

In a new country like Australia where the construction of railway lines has necessarily to be in advance of development, there are many hundreds of miles of lines where steam services cannot be economically operated. To provide a satisfactory service on these lines all states with the exception of Queensland are now operating gasoline driven rail motors. New South Wales has seven in service and is building ten more. South Australia intends to fully exploit this method of operating developmental lines, that system having ordered twelve rail motor cars, together with two spare engines and forward driving truck, from the United States. Victoria and Western Australia operate twelve and four rail motors respectively.

The results of gasoline rail motors in Queensland have not been entirely successful, and that state has now introduced a self-contained steam-driven car capable of hauling a trailer. This has proved very satisfactory

cars, the use of which will be extended to the outer suburbs as opportunity permits. Two electric freight locomotives are in use, but have so far been confined principally to switching services at one of the metropolitan freight stations, pending the completion of the overhead wiring of other freight yards.

The work on the Sydney (New South Wales) subway is proceeding, in conjunction with the electrification of the suburban lines. Upon the completion of the first section of the city railway, electric trains will operate over a section of the suburban lines. Apart from the construction of the underground tunnels, etc., for this railway, vast work is entailed in duplication (quadruplication in parts) of the track and preparing the lines for electric trains. In this connection additional platforms are being constructed at Central Station, part of which is being changed from a "dead-end" to a "through" terminal.

Highway Competition

Despite the increase of motor competition in all states, there has been no diminution in railway revenues. The railways have, however, suffered a loss of traffic and the importance of this competition cannot be overlooked. Motor transport offers certain advantages, and must be regarded as a permanent feature to be taken into account in the administration of the railways. At the present time it is felt that the railways are working under a disadvantage in this connection. Not only do the motors utilize highways constructed and maintained by, and at the expense of, the taxpayer, but, generally speaking, they carry only those classes of goods which, on account of their value, are subject to a higher rate of freight under the railway schedules. Freight of this class, upon which the railways rely to cover the low freight rates on less valuable commodities, is diverted from the railways, while the lower and less payable traffic is retained.

However, all systems are looking forward to the time when motor traffic will be called upon to bear a more nearly proportionate cost of the upkeep of the highways, and competition be carried on on more equitable terms. Until then, every effort is being made to prevent traffic being diverted.

Publicity

During the past year much attention has been paid to the increasing importance attached to an enlightened and informed public opinion, and the necessity for railway information and publicity along scientific lines. The lead in this connection has been taken by New South Wales and Victoria. New South Wales has a highly developed publicity and information bureau, efforts being concentrated on keeping the public informed, mainly through the press, as to the steps that are being taken by the railways to carry out their duties of a public utility.

Victoria is working along somewhat similar lines. In addition to the press, motion pictures are being utilized to inform the public of its railway services. A film entitled "The Victorian Railways System at Work" has been screened, not only in the metropolis, but in various country centres, including the public schools.

The desirability of bringing representative city and country business men into closer personal touch with each other as a means of promoting greater knowledge of the state's finances, resources and industry, has led to the running in Victoria of what is known as "The National Resources Development Train." This train comprises dining, sleeping and parlor cars and periodically carries business representatives over the various sections of the lines. These tours have been most successful and arrangements are being made for their extension. Arrange-



Ewing Galloway

Flinders Street Station, Melbourne

under the conditions existing in this state, and arrangements are being made to extend the use of these cars. Steam is generated in a series of coiled steel tubes, connected to a mud and steam drum, the steam pressure being 240 lbs. per square inch. The car can be driven from either end and seats 40 passengers, together with 50 in the trailer.

Electrification

Victoria and New South Wales are actively engaged in carrying out a program of electrification. The suburban passenger service of Melbourne (in the former state) is now wholly operated by electric traction, and preparations are in hand for extending the system. Practically all the express traffic within the metropolitan area is now being conducted by means of electric express

ments are also being made for the equipping of a "Better Farming" train to suit the plans of the Agriculture Department and the convenience of the farmers. The object is to give lectures and demonstrations of up-to-date farming methods by experts, with the hope that the railways will ultimately benefit by the increased traffic that can be expected from improved methods of farming.

Publicity has also been given to the desirability of stimulating and increasing the local consumption of dried and other fruits, the propaganda being principally conducted by means of special pamphlets and pictorial posters.

Educational Visit of Officers Abroad

Being convinced that Australian railway officers will benefit by an enlargement of their experience gained in

a study of railway operation in other parts of the world, a policy has been instituted by the various railway administrations of the Commonwealth of sending suitable officers abroad (especially to the United States) in order to give them every opportunity to investigate the practice followed by other systems in the particular branch of operation in which they are engaged. It is felt that the personal experience gained by these officers, together with the data obtained, will prove advantageous in the solution of many problems affecting the railways of Australia. The results so far have been entirely satisfactory, and arrangements are being made whereby additional officers will be afforded the opportunity of keeping abreast with the evolution of railway practice abroad by making extended tours of investigation in foreign lands.

OPERATING STATISTICS—AUSTRALIAN AND NEW ZEALAND RAILWAYS. YEAR ENDED JUNE 30, 1924

	New South Wales	Victoria	Queensland	South Australia	West. Australia	Commonwealth Railways. (Trans. Aust. Line)	New Zealand	Tasmania
Area, Sq. Miles.....	310,372	87,884	670,500	180,070	975,920	—	103,861	26,215
Population	2,228,290	1,639,704	824,540	529,090	353,651	—	1,349,826	—
Miles of railway open	5,522.4	4,435	6,040	2,451.4	3,629	1,051.4	3,053	673
Average miles of railway worked...	5,460.4	4,369	5,964	2,415.4	3,593	1,051.4	3,044	668
Total capital cost.....	£93,355,167	£66,253,102	(a)	£21,819,983	£19,638,044	£7,379,785	£41,355,077	(a)
Capital cost per mile open.....	£16,904	£14,939	137	£8,900	£5,411	£7,019	£13,546	316
Population per mile open.....	403	370	137	149	87	—	441	—
FINANCIAL RESULTS								
Total earnings	£15,616,577	£11,958,635	£5,714,036	£3,929,428	£3,227,371	£227,420	£6,975,338	£585,468
Total working expenses (excluding pensions and gratuities)	£10,917,491	£8,854,811	£4,990,749	£2,901,298	£2,290,892	£265,121	£5,393,310	£539,917
Net earnings	£4,699,086	£3,103,824	£723,287	£1,028,130	£936,479	£37,701	£1,582,028	£45,551
Percentage return on capital.....	£5.13	£4.94	(a)	£4.91	£4.77	£5.1	£3.83	(a)
Percentage of working expenses to earnings	69.91	72.90	87.34	73.83	70.98	116.58	77.23	92.22
Interest payment	£4,693,417	£3,001,370	(a)	£977,376	£787,221	£103,397	£1,550,815	(a)
Average rate of interest.....	5.1606%	(a)	(a)	4.8%	4.12826%	(a)	(a)	(a)
Surplus	£5,569	£102,454	£958	£50,754	£149,258	£141,098	£31,213	(a)
Earnings per average mile worked..	£2,860	£2,737	£958	£1,537	£898	£216	£2,291	£976
Working expenses per average mile open	£1,999	£1,995	£837	£1,201	£633	£252	£1,772	£808
Net earnings per average mile open..	£861	£742	£121	£326	£260	£36	£519	£168
Earnings per train mile.....	13 1.77	13 10.40	9 9.71	11 6.86	13 2.86	10 6.28	15 5.50	8 2.69
Working expenses per train mile....	9 2.29	10 1.32	8 6.81	7 6.53	9 4.77	11 8.23	11 11.43	7 7.01
Net earnings per train mile.....	3 11.48	3 9.08	1 2.90	3 0.33	3 10.09	1 7.95	3 6.07	7 6.6
Average number of employees on working expenses	30,998	25,708	(a)	7,771	6,758	745	(a)	(a)
Average rate of pay (working expenses)	£249	£249	(a)	£246	£241	£243	(a)	(a)
PASSENGER TRAFFIC								
Number of passengers carried....	128,101,184	167,861,864	29,535,981	25,107,379	13,133,168	31,805	28,411,467	2,959,887
Number of passenger carried one mile	1,721,160,868	1,421,770,736	(a)	290,842,572	(a)	26,339,411	(a)	(a)
Passenger earnings	£6,076,988	£5,330,614	£1,728,735	£1,089,971	£850,879	£112,112	£2,245,648	(a)
Passenger earnings per average mile worked	£1,112.95	£1,220.10	£289.86	£451.19	£236.82	£116.14	£770.58	(a)
Average mileage per passenger....	13.44	8.47	(a)	11.58	(a)	828.15	(a)	(a)
Average earnings per passenger....	11.39d.	7.62d.	14.05d.	10.42d.	11.26d.	£3 16 9	19.81d.	(a)
Total passenger train receipts.....	£6,797,887	£5,914,559	£2,092,693	£1,286,293	£996,776	£144,352	£2,751,306	(a)
Passenger train receipts per average mile worked	£1,244.98	£1,353.76	£350.89	£532.46	£277.42	£137.29	£903.85	(a)
Receipts per train mile.....	130.99d.	125.52d.	121.94d.	94.23d.	122.07d.	93.29d.	190.11d.	(a)
TRAIN MILEAGE								
Passenger train mileage.....	11,871,273	10,104,360	3,057,385	3,021,390	1,579,116	334,656	2,165,619	381,478
Mixed train mileage.....	1,686,997	2,408,365	3,430,132	764,016	1,142,039	110,145	3,922,742	595,897
Freight train mileage.....	10,197,627	4,735,045	5,162,902	3,006,214	2,154,568	8,941	2,936,142	446,452
Total train mileage.....	23,755,897	17,247,770	11,650,419	6,791,620	4,875,723	453,742	9,024,503	1,423,827
FREIGHT TRAFFIC								
Tonnage of freight hauled.....	15,693,127	8,309,543	4,273,926	3,565,307	3,023,299	32,858	6,916,444	732,941
Tonnage of freight hauled one mile	1,392,389,708	745,300,516	(a)	384,576,397	267,897,938	6,280,658	391,443,322	(a)
Ton-miles per mile of line (paying and free)	306.197	207.790	(a)	175.118	88.895	5.973	128.595	(a)
Average car load	9.08	8.53	(a)	7.08	7.15	(a)	(a)	(a)
Average length of haul.....	89.74	85.69	(a)	107.87	88.61	191.14	56.60	(a)
Average net train load.....	155	151	(a)	127	105	(a)	(a)	(a)
Average gross train load.....	362	337	(a)	278	(a)	545	(a)	(a)
Freight earnings	£8,096,274	£5,204,526	£3,463,443	£2,558,706	£2,050,707	£34,486	£3,949,587	(a)
Average freight earnings per mile worked	£1,482.77	£1,191.23	£580.72	£1,059.18	£570.75	£32.80	£1,297.49	(a)
Average freight earnings per ton mile	1.37d.	1.68d.	(a)	1 60d.	1.95d.	1.32d.	2.42d.	(a)
Average freight earnings per freight train mile	171.62d.	210.31d.	111.58d.	174.69d.	168.79d.	100.48d.	170.75d.	(a)
ROLLING STOCK								
Number of locomotives—Steam...	1,395	746	713	486	405	65	655	96
Electric	—	2	—	—	—	—	—	—
Gasoline	7	13	16	—	4	—	2	2
Steam Cranes	46	15	(a)	(a)	28	4	(a)	(a)
Passenger train cars.....	2,183	2,660	1,126	703	478	49	1,848	235
Freight train cars	21,928	19,235	13,809	9,321	9,695	280	25,220	1,717
Work cars	1,948	729	1,757	516	472	486	808	63

(a) Not available.

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miles. This will be increased during 1925 by 6,182 miles when the government takes over the management of the East Indian and Great Indian Peninsula Railways in accordance with the wishes of the Legislative Assembly.

The Railway Board at the end of the war consisted of a president and two members and included as advisory officers a chief engineer for construction and maintenance of way and a chief mechanical engineer for motive power.



Viaduct to Carry an Electrified Line Over a Freight Yard in Bombay

There were in addition a secretary and a number of assistant secretaries dealing with the various branches of railway operation. During 1921 a committee presided over by Sir William Acworth visited India and in its report on Indian railways it criticized the existing organization and made certain recommendations. It is from these recommendations and those of the Retrenchment Com-

missioner, a financial commissioner and two members, one of whom deals more particularly with operating and personnel questions while the other deals with technical questions relating to civil and mechanical engineering. Under the members are four directors, one each for:

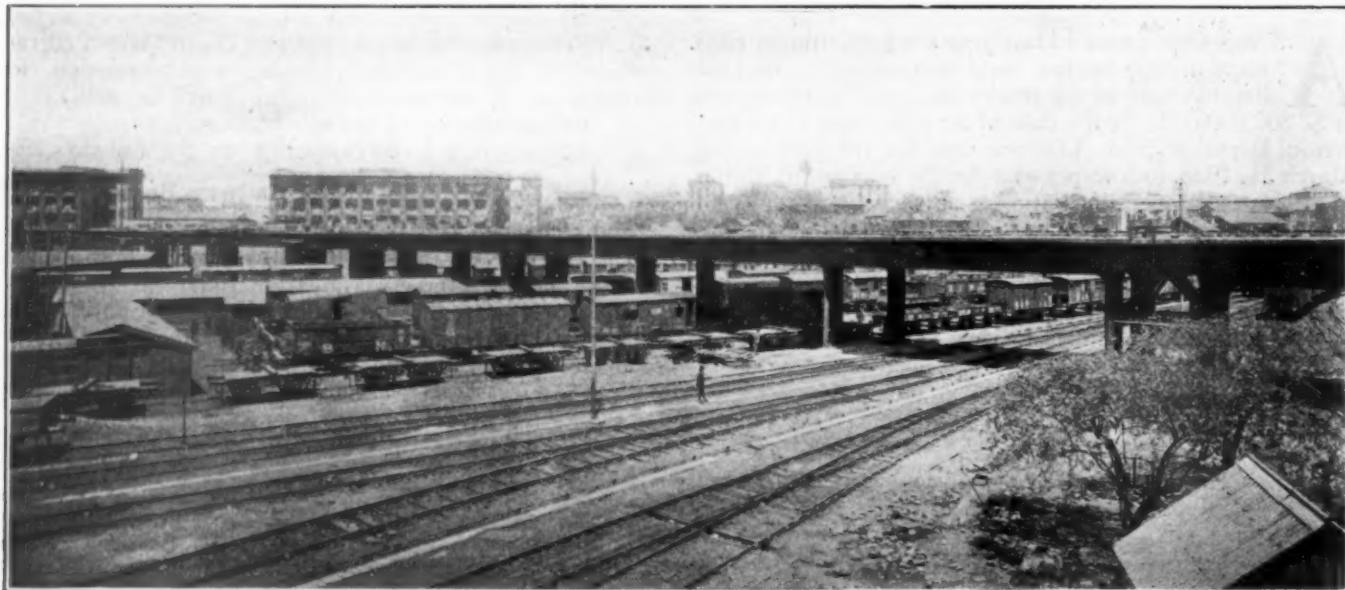
- (1) Traffic (i.e., operation).
- (2) Mechanical Engineering.
- (3) Civil Engineering.
- (4) Establishment (personnel).

These directors are executive officers and heads of departments and have the power to decide questions within the general policy of the board. Working under the directors are the deputy directors of traffic, stores, projects, way and works and establishment and an assistant director, technical, in charge of the drawing branch. In addition a deputy director in charge of statistics has been appointed and an assistant director to help him is being appointed as from January 1, 1925. The deputy directors are immediately in charge of branches dealing with definite phases of operation. There is also a secretary, who is responsible for the general conduct of the work in the department, for co-ordination between branches and in particular for correct relations between the department and other departments of government.

The question of transferring the supervision of railway accounts of state railways from the finance department to the Railway Board is still under examination and at present this work is carried out by the accountant general for railways who is responsible both to the Railway Board and to the auditor general.

Increased Power for Chief Commissioner

Very important changes have been made in the powers given to the Chief Commissioner and he is now solely



Viaduct for Electrified Line in Course of Construction, Bombay

mittee under Lord Inchcape in 1922-23 that the present organization which came into force on April 1, 1924, was evolved. As a preliminary step in November, 1922, a Chief Commissioner of Railways with greatly enhanced powers as compared with those of the president was appointed and it is his scheme differing in certain important particulars from that recommended by the Acworth Committee, which has been finally accepted by the government of India and the British government.

In the new organization the board consists of a chief

responsible under the government of India for arriving at decisions on technical matters of railway policy and cannot be outvoted or overruled by his colleagues on the board as was the case with the president.

Separation of the Railway Finances

The question of the separation of the railway from the general finances of the country has been under consideration for some time and as a result of deliberations extending over some years certain definite proposals were finally

placed before the Assembly in March, 1924. Up to then the conditions prevailing had inevitably tended to an alternative between raids by the state railways on the taxpayer and raids by the taxpayer on the state railways. The proposals made were intended to relieve the general budget from the violent fluctuations caused by the incorporation therein of the railway estimates and to enable the railways to carry out a continuous railway policy based on the necessity of making a definite return over a period of years to the state on the capital expended on railways.

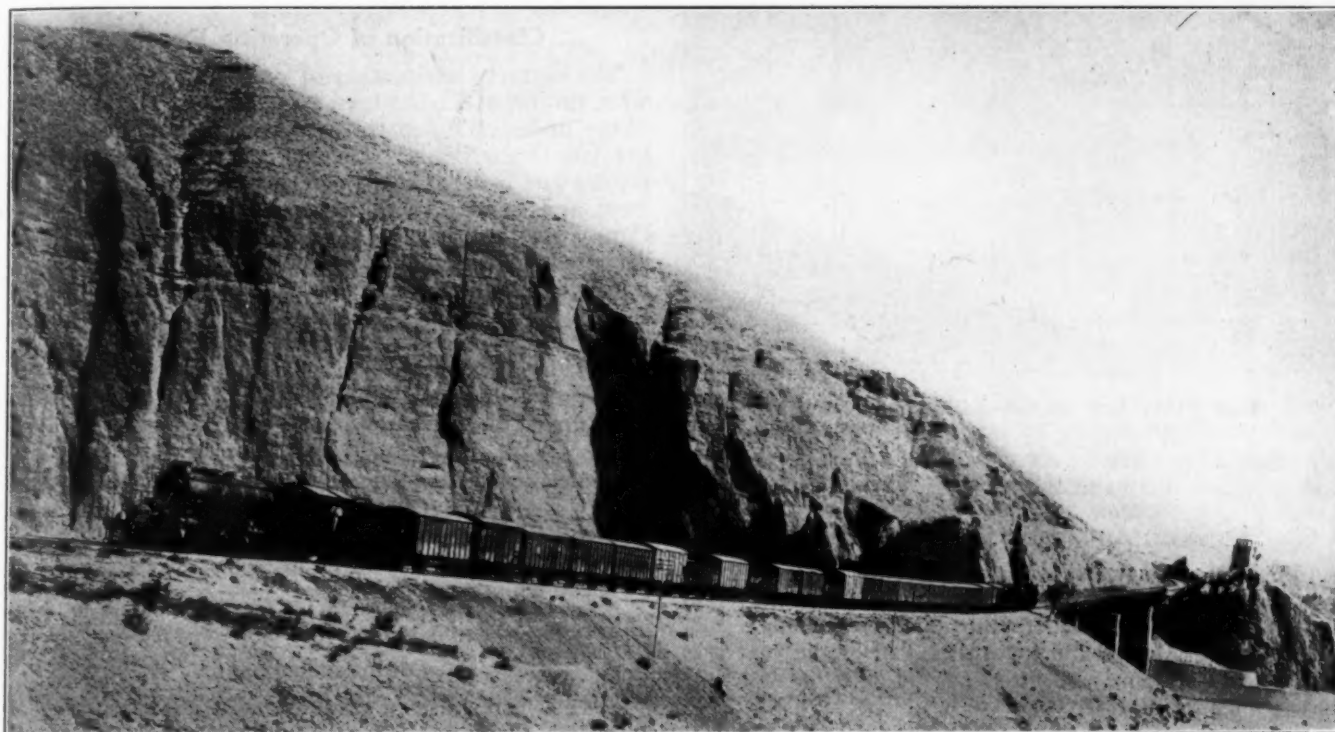
These proposals were examined by a special committee of the Assembly and in their final form they lay down that the railway finance shall be separated from the general finances of the country and that the general revenues shall receive a definite annual contribution from railways which will be the first charge on the net receipts of railways after payment of all interest charges on the government debt. The contribution shall be based on the capital

mittee, and fixes the dates when the railway budget shall be presented to the Legislative Assembly. These proposals are similar in many ways to those which are being introduced on Belgian railways where a law inaugurating financial autonomy for railways was presented to the Chamber of Deputies during the year and if passed will be introduced on January 1, 1925.

Indian Railways Adopting

American Type of Organization

The question of the best organization for Indian railways is one that has interested railway officers in India for some time and the Great Indian Peninsula Railway broke new ground by introducing a divisional organization in November, 1922. This organization was based on what is usually found on American railways but the maintenance of way and accounting departments and the operation of freight stations were excluded from the divisional



American Mallet with Two Pushers on a 4 Per Cent Grade on the North Western Railway in Baluchistan—Altitude, 3,400 Ft.—Train Has 23 Cars, 599 Tons

and operating results of commercial lines only, excluding lines built for military or administrative purposes and shall be a sum equal to one per cent on the capital at charge. At the same time one-fifth of any surplus profits remaining over after the payment of this fixed return will also accrue to general revenues. The remainder of the surplus profits will be paid into a railway reserve fund which will be used to make good any deficiencies in the fixed return paid to general revenues and to provide if necessary for arrears of depreciation and for writing down and writing off capital. Certain conditions are laid down if the amount payable into railway reserve exceeds a fixed sum in any one year. In such a case the general revenues will receive one-third of any excess over this fixed sum.

Simulating a Private Corporation

The remaining proposals lay down conditions under which the railway administration may borrow money temporarily from capital or from the reserves and also arrange for the appointment of a standing finance com-

organization. Due to the success which attended this scheme, the North Western Railway, the largest railway in India, with 5,828 miles of open line, introduced on October 1, 1924, a system of divisional organization which included the maintenance of way and accounting departments and the operation of the freight stations. The organization does not exactly follow American practice as the divisions are larger than those usually found on American lines while the headquarters organization follows that adopted on South African Railways where the president is assisted by a staff of principal officers each dealing with his own branch of railway operation and where the powers of the vice-president in charge of operation are not so accentuated as in America.

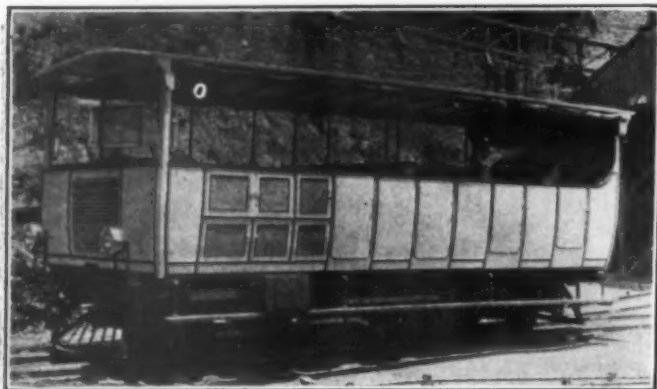
Other Changes Proposed

A similar organization is being worked out for the East Indian and the Oudh & Rohilkhand, two lines which will probably be amalgamated in the future.

As the conditions in India correspond in many ways

more closely to those found in America than in England, Indian railways watch with interest the latest developments in the railway world of America as the following examples will show.

During 1924 the first example of the Mallet locomotive was brought into use on the 5 foot 6 inch gage. The locomotive, which was built by the Baldwin Locomotive Works, is intended for work on the heavy grades of the Quetta district of the North Western Railway. It is a 2-6-6-2 articulated compound type fitted with superheater and with a tractive effort at 85 per cent working pressure of 52,600 lb. The weight of the engine and tender in working order is 274,000 lb. and 147,500 lb. respectively. At the same time a Garratt locomotive, which is another special type of articulated engine, has been ordered from England and is expected to arrive during 1925. These two locomotives will be tried on the same section and it



Rail Motor Car on the Kalha-Simla Railway

will then be possible to decide which is the best type for use on heavy grades in India.

Automatic Couplers

Considerable progress was made during 1924 in investigating suitable transition devices for the automatic couplers which it is proposed to introduce on Indian 5 foot 6 inch gage railways and before the end of the year it is hoped to have some cars fitted up for experimental purposes. The chief rivalry lies between the M. C. B. type as found in America and the Willison automatic coupler.

Statistics

Certain minor changes were made on April 1, 1924, in the revised statistics which were introduced on October 1, 1923, and which were similar in many ways to those found in the monthly statements furnished to the Interstate Commerce Commission in America. During the year further investigations were carried out and it is proposed to introduce certain changes on April 1, 1925, the beginning of the new fiscal year, so as to allow of better comparisons between railways and of better analyses of the work of individual lines.

The factors which affect the working of a railway include:

1. Ruling grades.
2. Curvature.
3. Relative proportion of main and branch lines.
4. Length of the average run.
5. Balance of traffic in the two directions.
6. Relative proportion of heavy traffic to total traffic.
7. Relative proportions of originating, terminating and overhead traffic.
8. Relative proportion of passenger and freight services.
9. Density of traffic.

and it is to supply information under these heads that the monthly statements and the annual reports will be expanded. The changes proposed will include figures similar to the eastbound and westbound figures compiled by American railways and figures of heavy traffic, terminating and overhead traffic and density of traffic, some of which have been advocated by various writers in the *Railway Age*.

Classification of Operating Expenses

The correct classification of operating expenses is another subject which has been taken in hand and the expenditure under each departmental head is now shown under the four main heads: General administration, ordinary repairs and maintenance, operating expenses, and replacement and renewal, with separate figures for "cash" and "stores and suspense." This is somewhat similar to the proposed subdivision of primary accounts in America under "labor," "material" and "miscellaneous."

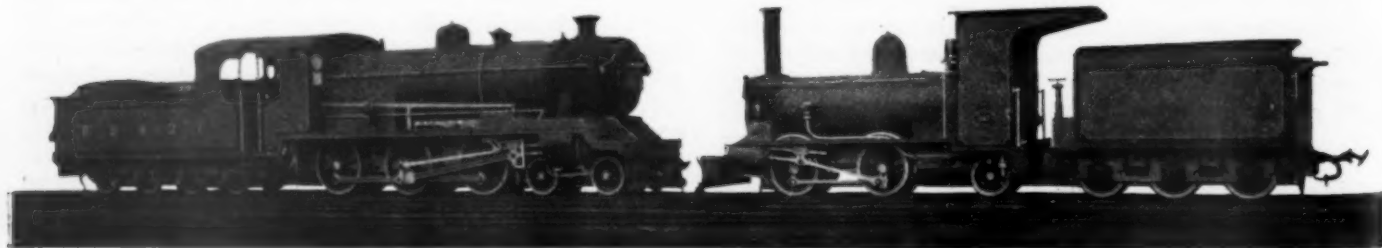
Investigations in Progress

Indian railways are, however, not content to let other countries lead the way in all things and investigations are being made of such questions as the possibility of

1. Opening up new forest areas.
2. Substituting new varieties of indigenous timber, suitably treated, if necessary, for ties.
3. Using larger numbers of steel, cast iron and reinforced concrete ties.
4. Using the cheaper varieties of timber, suitably treated, for passenger car construction.
5. Introducing artificial means of seasoning timbers to obviate the necessity of having to keep in stock large supplies.

Standardization

Further progress was made during 1924 in working out standards for all classes of rolling stock and the policy of the Railway Board is one of "progressive standardization as a continuous process." Improvements on original designs will be encouraged and the superintendents of motive power will be given a free hand to try them on a few units. At the same time standard designs will be reviewed periodically to ensure progress and efficiency and to prevent stagnation. Conditions in India differ from those in America and in addition to standards for passenger car underframes and freight cars, standards have been drawn up for locomotives, as at present all locomotives are imported except in the case of one railway which builds some of its own.



Locomotives New and Old on the Bombay Baroda & Central India (3 ft. 3 3/4 in. gage)



Beginning Earthwork on a Section of the Lung-Hai

War Blights Prosperity in China

Prospects for prosperous railway year were good in spite of floods until civil strife began

By Railway Age's Correspondent in China

THE year 1924 on the railways of China has been typical of many predecessors, and most probably many successors will be like it before the divergent political forces come to a condition of stable equilibrium sufficient to make possible any considerable railway progress. The year began with the momentum acquired during a quiet 1923. There had been neither floods, famines nor military maneuvers in railway territory during 1923 and revenues mounted to \$120,000,000 or \$21,000,000 more than in 1922. This included \$9,500,000, however, from the Shantung line which for the first time was included among the government railways. Operating expenses absorbed less than half of this increase, and in spite of

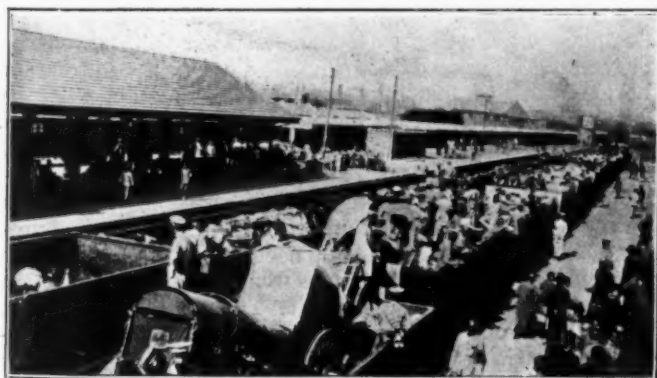
line and the Peking-Hankow showed increases of more than 25 per cent. While the short lines in the south, the Changchow-Amoy, and the Canton-Kowloon were virtually shut down by military interference, the earnings of those lines had little practical effect on the total and the only other lines to show decreases were the undeveloped Hupeh-Hunan and a short branch of the South Manchuria Railway known as the Kirin-Changchun.

Then came the floods of the summer. Although the rainfall was excessive and fully as much territory was inundated as in 1917, very little damage was done to track. The breaks that occurred on the Peking-Hankow, Peking-Suiyuan and South Manchuria lines were all repaired in three or four days. But the continued rain interfered seriously with the transport of freight to the railway and loading at stations, so that earnings during July and August will show little if any improvement over the year before. The floods were followed immediately by the campaigns beginning in September and there railway revenues virtually cease.

Financial Events

Early in the year one group of creditors brought strong pressure to bear upon the Peking-Suiyuan line to induce it to adopt a funding plan by which to meet its heavy obligations for equipment and track material, and to furnish it with capital by which to extend its shops and complete the Paotou extension. Briefly, this plan proposed a bond issue in American dollars, Chinese yuan and Japanese yen secured by a mortgage upon the line and placing the administration of the line in the hands of nominees of trustees for the bondholders. The proponents of this plan protested against the weekly payments being made to one creditor based upon a participation in car earnings. The proposal to turn the administration of the Peking-Suiyuan over to foreign officers provoked a considerable press opposition, and the railway management abolished the discrimination between creditors by ceasing to pay over the accustomed share of the car earnings. Thus the net result has been that none but Chinese creditors are receiving any of their principal from this railway.

Although an arrangement was made about two years ago whereby the Tientsin-Pukow line agreed to deposit



Wu Pei-fu's Troops at Tientsin East en Route to Shanhai-Kuan

a heavy increase in interest on short term obligations the surplus for the year was probably about \$4,000,000 more than the year before, or an increase of 15 per cent. (The relaxed administrative control has resulted in reports being so delayed that the final figures for the year 1923 are not yet available). Gratifying as were these figures for 1923, the first six months of 1924 overtopped them by nearly \$10,000,000.

In this revenue increase all of the major lines shared more or less proportionately except the Peking-Mukden and the Shanghai-Hangchow-Ningpo. The Shantung

monthly sufficient funds to cover interest payments and due instalments of mortgage bonds, the native chief accountant of the line has been unable to resist military demands for funds during the present summer. The result is that although the line shows the largest earnings in its history, October and November payments on loan service are in default.

Two important agreements affecting railway finance were made during the year. One, with the British & Chinese Corporation, settled the dispute of long standing as to how future capital requirements of the Shanghai-Nanking railway are to be met. In the original loan agreement no interest or profit on investment by the government was provided for. The new arrangement grants interest at current rates to the government, which in return makes provision for the amortization of the loan bonds to begin in 1928. The government is also allowed to use the remainder of its share of the net profits for loan service on other lines, giving preference to those for which the British & Chinese Corporation acts as trustee.

The other agreement concerns the German portion of the Tientsin-Pukow and Hukuang bonds. Following China's entry into the world war, she announced the suspension of service upon these bonds except those which could be affirmatively proven to have been in non-enemy hands at the date of the notice. This drew upon China a very considerable amount of criticism, especially from American banking interests, on the ground that these were bearer bonds. As the result of an agreement made with the German government, service upon these bonds began on October 1, 1924. In the meantime, a considerable number of bonds have been drawn and coupons have matured. These are to be paid off at the rate of two coupons and one drawing per year. The German government is to deliver to the Chinese government £1,087,768 of such coupons for cancellation. In addition, the German government delivers to the Chinese government bonds and other coupons of these two railways, which at current market values and current rates of exchange are sufficient to make the total equivalent to \$30,839,977.35 (Mex).

Construction

The construction of the Lung-Hai line has continued throughout the year. The temporary western terminus, Shenchow, located somewhat east of the great bend made by the Yellow river where its course is changed from south to easterly, was reached in February. On this section ballasting of track and building of structures has occupied forces since that time. On the eastern section, rail has been laid to a point not more than forty miles from Haichow, on the coast. A motor car service has been instituted from Haichow to railhead, whence commercial traffic can proceed over four hundred miles west. When one considers that this point is the "furthest west" for railway construction in China, it becomes apparent that only the fringe of the Asiatic continent has been touched by railway development. During the summer, however, arrangements were made with native banks and with the construction syndicate for a continuance of the line westward to Sian-fu, the capital of Shensi. This is the first instance of foreign contractors being financed by native capital and is worthy of note for that reason. However, the construction syndicate will finance the purchase of equipment, rail and ties.

On the Taokow-Chinghua line work was begun on the westerly extension after a wait of four years since the contract was signed. The work had proceeded only a short distance when trouble concerning right-of-way was encountered and at last reports the earthwork contractors

had suspended operations. On the Peking-Suiyuan line, the raising up of the track and ballasting of the Paotou extension has proceeded slowly.

New Projects

Agitation for the building of new lines took on a novel phase during the past year. It emanated exclusively from the entourage of Marshal Wu Pei-fu. The first move was the signing of the Hollamby contracts which covered a line from Tientsin northerly to the Manchurian border and another connecting the Peking-Hankow line with the Tientsin-Pukow line. These two lines constituted a direct threat to Chang Tso-lin, the Manchurian war lord, by making possible to Wu two lines of communication from his camp at Loyang (Honan-fu) to



South Manchurian Ry. Station at Changchun, Where the Kirin-Changchun and Chinese Eastern Join the South Manchurian—Note Kirin-Changchun Freight Equipment at Left and South Manchurian Passenger Equipment at Right

Tientsin and two lines from Tientsin to Manchuria. Some influence, however, led Chang to halt the building of the Chaoyang branch of the Mukden-Shanhaikuan lines at the Pei Piao mines instead of carrying it on to the Chihli border. Thereafter, nothing was heard of the Hollamby contracts. Later in the summer another British company was given an option on the Tsang-Shih line (a connection between the Peking-Hankow and the Tientsin-Pukow) but could not finance it.

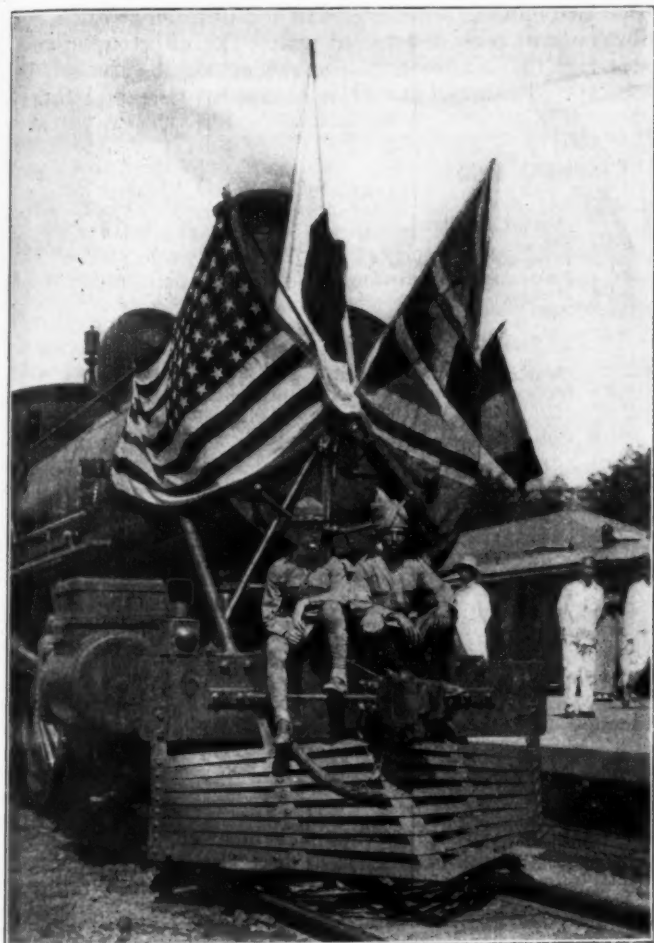
At about the same time the Peking Syndicate, which operates the Taokow-Chinghua line, made a contract for the extension of this line easterly to a junction with the Tientsin-Pukow line just north of the Yellow river. This would give the Peking Syndicate an improved outlet to deep water (over the Shantung Railway) for the output of its coal mines. But it would also give Wu Pei-fu a very much improved connection with his native province, Shantung, and a much needed additional route to Tientsin. At the same time that construction began on the westerly extension of the Taokow-Chinghua line, Wu made strong representations to the Ministry of Communications in favor of a bridge across the Yellow river to connect this extension with the Lung-Hai line.

During the summer Wu was the animating spirit behind the agitation for the use of the Boxer Indemnity, remitted by the American government, for railway construction. When announcement was made that the American government had definitely committed itself to a preference for cultural fields the object of the agitation was made the British portion of the indemnity, it being known that the British government has the remission of its portion under consideration.

It has been pointed out that the British portion would be sufficient to complete the Canton-Hankow line and leave sufficient to build a considerable portion of the Hankow-Szechuan line.

Progress of Administration

Very little can be recorded of progress in administration during the year. Early in the year a conference of traffic managers was held in which the Ministry held out to discussion the benefits which would accrue from the introduction of the "train control" system, a form of train dispatching. The Shanghai-Nanking line after more than a year of trial was convinced that considerable reductions in train delays were made possible by its use, thus admitting of an increased density of traffic on busy lines. But many of the lines opposed its introduction on the ground that train delays were a matter of little importance in China. Strangely enough, this view was voiced by foreign officers rather than by Chinese. However, the



Treaty Provisions Require That War or No War, Railways Must Be Kept Open from Peking to the Sea—Above Is International Train Arriving at Peking from Tientsin

Ministry has created a small section, known as the car control office, whose duties consist of tabulating a daily record of the car situation from telegraphic reports from each line and the propagandizing of the different lines in favor of "train control" by means of telegraph or selector telephone.

A meeting of the technical officers of the lines was held early in the year to look into the question of standard specifications for lubricants and means of fostering fuel efficiency. A beginning is being made in the way of daily records of fuel consumption by locomotives.

No meeting of the Standing Committee on the Unification of Railway Accounts occurred in 1924. The meeting scheduled for May was postponed until autumn in order to permit of participation by Chinese abroad

at that time. By autumn the civil war made a meeting impossible.

The Shantung Railway

During the first half of the year the Shantung Railway drew considerable attention. The Chinese community had given the line its confidence so that revenues were mounting rapidly. Not only were interest payments met easily but sufficient was left over to permit the management to begin the program of renewing bridges. This surplus attracted the attention of Wu Pei-fu, who attempted to compel the line to support his navy. This attempt was resisted by the officers of the line with the result that a complete change in higher personnel has been made, with the exception of the locomotive superintendent. In the effort to justify its position, the management called for a survey of the line's condition by a technical commission. This commission was appointed by the Ministry and proceeded at once to make the survey. But before the members had returned from the twenty-day survey the managing director was changed and before their report could be rendered the chief accountant was arrested and later discharged. The dismissal of the chief of the materials department and of the chief engineer followed soon after. The commission recommended an immediate replacement of bridges, installation of train dispatching telephones, improved water and terminal facilities and a program of rail-changing and double tracking to proceed as fast as finances would permit. But the new administration immediately purchased property from the Civil Administration of Tsing-Tao to the extent of \$700,000, and this money was turned over to the navy.

The Chinese Eastern Railway

The success of China in securing the return of the Shantung Railway as a result of the Washington Conference gave rise to the hope in the breasts of the younger generation of Chinese that the same result could be obtained with respect to the Chinese Eastern. At the Washington Conference the younger Chinese were so sure that they were in an advantageous position upon that line by reason of the agreement which had been made the year previously with the Russo-Asiatic Bank that they practically refused to discuss the subject, and rejected in high dudgeon a cautious suggestion that they should ally with themselves some international assistance. Less than a year afterward they began to realize that equal membership on the board of directors gave them no powers of initiation whatever and very limited powers of veto or suggestion. The actual power was all in the hands of the Russian general manager nominated by the bank. This *de facto* position has been used by the representatives of Soviet Russia to such good purpose that the treaty of recognition which was negotiated during the year, to all practical purposes merely substitutes the Soviet nominees for the bank nominees, leaving Chinese authority just where it was before. To be sure, the civil administration of the territory traversed reverts to China. It had been exercised by force of Chinese arms for the past four years and so in that respect, the treaty merely regularizes the *de facto* situation.

Not only is the treaty a disappointment to the aspirations of the younger generation, but in many respects it is a bad bargain for the Soviet government. Under the form of management which has prevailed in the past, the line has never shown any considerable profit. The duplicate organizations maintained by the board of directors and the railway administration not only involve heavy operating expenses, but they paralyze effective executive management. The Soviet organization will endeavor to promote the interests of the port of Vladivostok by manipulation of rate structures and train schedules and

the construction of branches. These will invariably be opposed by the Chinese to such an extent that little progress can be made. The result will be that the line will continue to show no profits. Whereas if it were sold for a fair figure to China, not only would China be able to use it for the development of the territory traversed, but she would be able to pay to the Soviet government a tidy sum as interest on the purchase price.

The treaty negotiated at Peking was so unsatisfactory to Marshal Chang Tso-lin, through whose territory the railway passes, that he refused to recognize it or to permit any changes in the railway personnel. However, under the pressure of the Soviet government and in view of the opening of hostilities with Wu Pei-fu, he consented to the essential features of the treaty, the principal exception being that the period before the line reverts to China without cost is shortened by twenty years, a third of the remaining period. Accordingly, the Soviet directors have taken their seats on the board and have replaced the general manager and his immediate familiars with appointees

that the port of Vladivostok is making an effort to regain the trade which has gone to Dairen, that the railway will be forced to haul the bulk of its export traffic over the heavy grades toward Vladivostok rather than down the valley to Changchun, and that the old competition with native carts, subsidized by the South Manchurian as a means of getting into the bean trade of Harbin, will again take traffic from the Chinese Eastern. The strength of the two lines is attested by the fact that although the South Manchurian is only two-thirds as long as the Chinese Eastern its revenues are nearly three times as great. This struggle for the trade of Harbin may have serious consequences on the political future of Manchuria.

The War

For two months the energies of the Chinese government railways have been devoted to war. The effect upon revenues and the condition of the rolling stock can well be imagined. Bridges have been blown up here and there,

CHINESE EASTERN—BALANCE SHEET—1922

ASSETS.		LIABILITIES.	
			Amount (Roubles)
B-5.	Investment Assets.	B-1.	Capital Liabilities.
B-5-1	Cost of Road and Equipment	B-1-1	Shares
B-5-2	Cost of Other Physical Property	B-1-2	Premium on Shares
B-5-3	Cost of Non-Physical Assets	B-1-3	Permanent Government Investment
		B-1-4	Mortgage Bonds
		B-1-5	Other Secured Indebtedness
	Total Investment Assets:		Total Capital Liabilities
B-6.	Working Assets.	B-2.	Working Liabilities.
B-6-1	Cash	B-2-1	Loans and Bills of Exchange
B-6-2	Loans and Bills of Exchange	B-2-2	Traffic Balance Payable
B-6-3	Traffic Balances Receivable	B-2-3	Matured Liabilities Unpaid
B-6-4	Other Accounts Receivable	B-2-4	Other Accounts Payable
B-6-5	Stores		Total Working Liabilities:
	Total Working Assets:	B-3.	Deferred Credit Items.
B-7.	Deferred Debit Items.	B-3-1	Temporary Advances from Government
B-7-1	Advances to Government	B-3-2	Operating Reserves
B-7-2	Payments Made in Advance	B-3-3	Depreciating Reserve
B-7-3	Unextinguished Discount on Funded Debt	B-3-4	Liability on Account of Provident Funds
B-7-4	Inventory in Use	B-3-5	Miscellaneous Deferred Credits
B-7-5	Special Funds		Total Deferred Credits
B-7-6	Miscellaneous Deferred Debits	B-4.	Accumulated Surplus
	Total Deferred Debits:		(Errors in Transcription)
B-8.	Accumulated Deficit		Total
	(Error in transcription etc.)		
	Total		

¹ Includes about 124,000,000 roubles for military and civil institutions incident to colonization.

² Advances by government during operating period to cover additions to property, loan redemption and deficits about 207,000,000 roubles.

of their own. The next act of the board was to cause the arrest of the general manager, the chief of the land department, the chief accountant and the chief of the commercial department, for alleged misdeeds which could not be punished by the board of directors until the Russian members sided with the Chinese. This indicates the powerless position of the Chinese on the present board.

During the past year the accounts of the Chinese Eastern Railway were finally reduced to a gold basis and it has become possible to restate the balance sheet according to a standard classification. The copy of the balance sheet for 1923 published herewith is worth close scrutiny and serves to clear up many points which have been seriously disputed. For one thing, it indicates that the actual construction of the railway could not have been such an orgy of corruption and waste on the part of the engineers as has often been alleged. The waste of funds resulted from later operation or from matters of policy rather than from technical inefficiency or dishonesty on the part of the builders.

Recently, the Chinese Eastern has canceled the rebate agreement with the South Manchuria line, under which a considerable volume of goods was delivered by the Chinese Eastern to the South Manchurian. This means

but on the whole the roadbed has not been damaged so severely as would be the case had the military forces been more advanced in their railway knowledge. While the first few weeks of the military movements indicated that the officers had progressed considerably over previous performances in the directing of military transport, yet their best was less than half as good as the normal performance of the lines. None of the movements showed any planning which took into consideration the necessities of the commissary, terminal facilities sufficient for temporary rail heads, nor use of the telegraph in the regulation of the initiation of movements. Later weeks were characterized by complete demoralization. As these lines are being written the prime mover in the season's hostilities sits astraddle two lines awaiting the moves of his former lieutenant who has engineered a plot with the professed purpose of stopping all fighting. However laudable the motive behind this plot, the result will probably be that the territory which during the past year has been held to its loyalty by Wu Pei-fu will be parcelled up among a half-dozen of his former subordinates and allies. The consolidation of the coastal plain has most likely been set back by just so much as Wu had accomplished during the past two years.

General News Department

The Denver & Rio Grande Western is constructing a six-stall addition to its roundhouse at Montrose, Colo.

Dictionaries are now provided on the principal passenger trains of the Pennsylvania Railroad for the benefit of crossword puzzle addicts.

Railroad stations in Nova Scotia report this year sending an aggregate of 150 carloads of Christmas trees to points in the United States. About fifty carloads or more were destined to New York City.

The Pullman Company distributed a card of Christmas greetings to patrons riding in its cars on Christmas day. The card was in the form of a postcard, printed in four colors, and in shape to be mailed. Between 90,000 and 100,000 of these cards were distributed.

The Missouri Supreme Court has overruled the motion of the Wabash for a re-hearing of the Delmar boulevard (St. Louis) grade crossing case, in which the Missouri Public Service Commission ordered the Wabash to construct a subway under the boulevard rather than a viaduct over it. This order has been strenuously opposed by the railroad company.

The suggestion plan placed in effect by the Missouri Pacific last August, under which its employees are encouraged to submit plans for bettering shop practices, has been accorded the enthusiastic support of employees throughout the system. Under the plan the employees elect production and executive committees to pass upon the suggestions submitted. At Sedalia, Mo., where the suggestion plan first went into effect, approximately 90 per cent of all those employed at the Sedalia shops indicated their interest by casting ballots for members of the committees.

The Missouri Pacific has established a complete additional train to be run as a second section of its Sunshine Special, southbound. Under the new arrangement the first section will carry passengers for north and west Texas points and the second section through passengers for south Texas and the Mexican gateway at Laredo, Texas. Through an arrangement with the Southern Pacific a St. Louis-Los Angeles through sleeper will be added to the first section, connection being made at El Paso, Texas. A through St. Louis-Hot Springs sleeper and a Memphis-Los Angeles sleeper also will be run.

The Beaumont-Galveston division and the Shreveport division of the Southern Pacific in Texas, have been abolished, and are replaced by the newly created Beaumont division. The Beaumont division will embrace the lines heretofore included in the Shreveport division and the Beaumont-Galveston division, with the exception of the line from West Junction, Tex., to and including Galveston via Harrisburg, which has been added to the Houston division. The officers of the new Beaumont division are those formerly in charge of the operation of the Beaumont-Galveston division.

The Observer is the title of a claim prevention bulletin recently issued to employees of the New York Central, containing instructions for correcting errors and other interesting matter. The pamphlet is issued by the Hudson, Electric, Harlem and Putnam divisions. The title page shows an owl perched on a limb of a tree, emblematical of the manner in which employees should look for mistakes. Employees are instructed to call the freight claim secretary if they notice any car poorly loaded, stowed or braced. During the months of October and November a special effort was made to prevent overs and shorts. The Rochester division has issued a similar paper called "The Lookout," which bears a picture of a lookout nest on the mast of a ship. During October and November this division likewise placed emphasis on the prevention of overs and shorts. This paper is issued weekly; the other

semi-monthly. In the issue of November 20 "The Lookout" showed a decrease in freight claim payments during October as compared with September.

Supplemental Report on Bolton (Vt.) Derailment

The Interstate Commerce Commission has issued a report on its supplemental investigation of the derailment of northbound passenger train No. 1 on the Central Vermont near Bolton, Vt., on March 11, last, when three passengers were killed and 69 injured. The original report, noticed in the *Railway Age* of July 19, 1924, held that the badly worn condition of the ties was the principal reason for the failure of a rail which led to the derailment. The conclusion of the present report is simply a brief statement of the tie renewals and other improvements which have been made in the track on this division of the road. There is no word as to what degree of approval is or should be accorded this improvement work.

Higher Wages Will Not Necessitate Higher Rates

The Railroad Labor Board has denied the petition of the managers representing the Western Railways that the settlement made by the Southern Pacific with its enginemen and firemen be set aside. This petition, noticed in the *Railway Age* of December 27, page 1180, averred that the proposed advance in wages would tend to necessitate general increases in freight rates. The board holds that there is no sufficient ground for this contention. The board considers only the increase on the Southern Pacific and compares only with that company's earnings. The board ignores the fact, presented by the managers, that the engine service brotherhoods had already gone to one other road with the demands that were made on the Southern Pacific; this as the first step in a campaign to have the Southern Pacific agreement apply generally to the western roads. The engine service brotherhoods were given until January 1 to agree to the provision of the Labor Board's decision in the case which ordered wage increases of six per cent, accompanied by changes in working rules which the brotherhoods violently opposed. There is no expectation among the western managements that this decision will receive any consideration whatever from the brotherhoods. If they ignore the decision, as is expected, the Board's finding provides that the same wage rates and working rules that have been in effect shall be continued.

Special Football Train Across the Continent

The special train started by the Pennsylvania on December 26 for California to carry the University of Pennsylvania football team to Berkeley stadium for the game with the University of California on New Year's Day, is scheduled for one of the longest trips ever made in football history for a single game, and is called a unique train. A baggage car is provided, fitted up as a gymnasium for exercise and for shower baths. In the dining car the team and substitutes will be provided approved training table meals, while the regular dining car service will be available for other persons in the party. The train will have one 16 section sleeping car for the university team exclusively, and four 12 section sleepers and one seven compartment sleeper for other members of the party; also a special car for the chairman of the university council on athletics and his party. The dining car crew will be accommodated in a combined car fitted up with bunks.

From Chicago the train goes over the Chicago, Milwaukee & St. Paul, the Union Pacific System, and reaches Ogden, Utah, at 2:00 p. m., Monday, December 29th. Leaving Ogden by the Southern Pacific arriving at Berkeley, Cal., on Tuesday, December 30, at 1:39 p. m. The game will be held on Thursday, January 1. On Thursday night the party will leave San Francisco at 8:15 p. m. on the Southern Pacific for Los Angeles and Hollywood.

The return will be over the Atchison, Topeka & Santa Fe and the Pennsylvania. Stops will be made at Grand Canyon, Arizona, and Albuquerque, N. M.

Equipment and Supplies

THE UNION PACIFIC is inquiring for one three-cylinder locomotive.

THE INTERBOROUGH RAPID TRANSIT COMPANY has ordered from the Union Switch & Signal Company the materials for an electro-pneumatic interlocking plant at 149th street, New York City.

THE MICHIGAN CENTRAL has ordered from the Union Switch & Signal Company materials for installing a Union electric interlocking at Windsor, Ont., comprising a Type "F" electric interlocking machine with six working levers for switches and three for signals. There will be 11 color light dwarf signals and eight Style "M" electric switch and lock movements.

THE PENNSYLVANIA RAILROAD has awarded a contract to the Union Switch & Signal Company for the installation of an electro-pneumatic interlocking plant at the Cincinnati (Ohio) passenger station; a 43-lever machine, all signals will be position light dwarfs. The layout comprises 28 signals and 21 switches. All functions will be worked by direct current, while alternating current is to be used for the track circuits.

THE GREAT NORTHERN is receiving bids on various classes of equipment which are available for motor service on its branch lines, and is asking for figures on the following: Four gas-electric cars, these cars are to be straight baggage cars with a double end control; four direct gasoline driven cars with single end control, cars to be not less than 50 feet long and designed as standard baggage cars, and for four complete sets of trucks with gasoline power plants mounted thereon for application to existing baggage cars, these cars are to be straight baggage cars with a double end and be handled with single end control.

Supply Trade News

J. L. Price, secretary-treasurer and a director of the Chicago Pneumatic Tool Company, New York, has resigned, effective January 1.

The Waterbury Battery Company has removed its general sales offices from 30 Church street, New York, to the general offices of the company at Waterbury, Conn. There will be no change in the personnel of the general sales staff.

J. L. McQuarrie, assistant chief engineer, has been appointed chief engineer of the International Western Electric Company, to succeed E. B. Craft, who has become vice-president of the Bell Telephone Laboratories, Inc. Mr. McQuarrie has served with the Western Electric Company continuously since 1894. H. B. Gilmore, since 1908 manager of the supply distributing organization of the Western Electric Company at Boston, Mass., has been elected assistant secretary of the company at New York. Mr. Gilmore succeeds J. W. Farrell, who has become secretary and attorney of the Bell Telephone Laboratories, Inc.

F. A. Merrick, vice-president and general manager of the Canadian Westinghouse Company, has been elected vice-president and general manager of the Westinghouse Electric & Manufacturing Company. He will have general executive charge of the activities of the parent company with offices at East Pittsburgh, Pa. The office of President E. M. Herr has been moved to the Westinghouse building, New York. Frank A. Merrick received his technical education at Lehigh University. Shortly after graduation he served with the Steel Motors Company, a subsidiary of the Lorraine Steel Company, and later became chief engineer. He subsequently joined the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa., where he had charge of the production of street railway motors and after the formation of the Canadian Westinghouse, Ltd., in 1903 he was its superintendent, and later became manager of works and finally vice-president and general manager. During the war Mr. Merrick

had charge of the factory of the New England Westinghouse Company, which was engaged in turning out rifles for the Russian government, and later supplying the United States with machine guns. After the war Mr. Merrick was located in London for two years as special representative of the Westinghouse Electric International Company, and then returned to Canada to resume his original duties.

Railway Officers

Olaf Hoff, consulting engineer and at one time engineer of structures of the old New York Central & Hudson River (now New York Central), died on December 24, at his home in Montclair, N. J., at the age of 65.

Frank Grace has been appointed commercial agent for the Kansas, Oklahoma & Gulf, the Minneapolis, Northfield & Southern, the Chicago, Attica & Southern and the New Orleans & Great Northern, with headquarters at St. Louis.

O. B. Schoenky, master mechanic for the Southern Pacific, with headquarters at Tucson, Ariz., has been promoted to superintendent of motive power, with headquarters at Los Angeles, Cal., succeeding Patrick Sheedy, who has retired. G. F. Burke, general foreman, with headquarters at Roseville, Cal., has been promoted to master mechanic, with headquarters at Tucson, succeeding Mr. Schoenky.

Julien L. Eysmans, assistant general traffic manager of the Pennsylvania, with headquarters at Philadelphia, Pa., has been promoted to general traffic manager, with the same headquarters, effective January 1. He succeeds Robert C. Wright, whose death on December 6 was announced in the *Railway Age* of December 13. C. B. Sudborough, traffic manager of the Southwestern region, with headquarters at St. Louis, Mo., has been promoted to assistant general traffic manager, with headquarters at Philadelphia, succeeding Mr. Eysmans, also effective January 1.

George L. Sitton, whose promotion to chief engineer maintenance of way and structures of the Southern, Lines East, with headquarters at Charlotte, N. C., was announced in the *Railway Age* of December 6, was born at Anniston, Ala., on October 21, 1888. He was graduated from the University of Tennessee and entered railway service on June 13, 1907, as a rodman for the Southern at Knoxville, Tenn. From 1908 to 1911 he served first as a laborer and later as transitman, being promoted on the latter date to assistant engineer at Knoxville. In 1913 he was appointed assistant roadmaster at Greenville, S. C., and in January, 1914, he was promoted to roadmaster at Charleston, S. C. In July of the same year he was promoted to resident engineer at Richmond, Va., where he remained until 1917 when he was promoted to engineer maintenance of way, with the same headquarters. A year later he was transferred to the Northern district at Danville, Va., which position he held at the time of his recent promotion. His entire railway service has been with the Southern.

Daniel B. Packard, whose promotion to engineer of construction of the Atlantic Coast Line, with headquarters at Wilmington, N. C., was announced in the *Railway Age* of December 6, was born at Greenville, Pa., on January 8, 1881. He was graduated from Cornell University following which he entered railway service with the Bessemer & Lake Erie in 1905. In 1906 he left the service of this company to enter the employ of the Norfolk & Southern (now Norfolk Southern) as a resident engineer on bridge construction, remaining in this capacity until 1908 when he left railway work to become city engineer at Washington, N. C., later becoming bridge engineer for Beaufort county, N. C. In 1910 he returned to the Norfolk & Southern as a resident engineer and later as chief of the party on location up to 1912 when he left the service of that company to become associated with the Atlantic Coast Line as resident engineer. From 1912 to date, Mr. Packard has been continuously with this latter company being subsequently promoted to assistant engineer, division engineer, engineer of surveys and office engineer, the position which he held at the time of his recent promotion to engineer of construction.